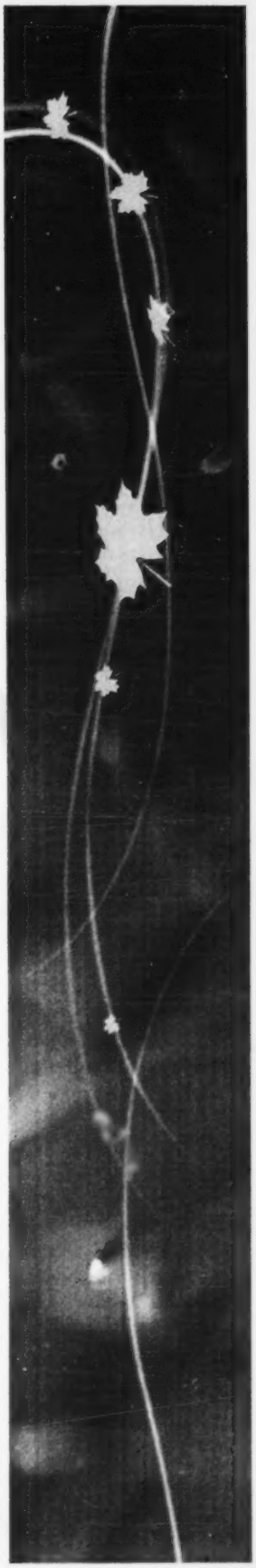

Environment Canada Environnement Canada

A Climate Change Plan for the Purposes of the *Kyoto Protocol Implementation Act*

May 2009

Canada

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Preface – The *Kyoto Protocol Implementation Act*

On June 22nd, 2007, the *Kyoto Protocol Implementation Act* (KPIA) received Royal Assent. This is the third iteration of the Plan required under the Act, the previous having been released on May 31, 2008.

Legal requirements

As per the *Kyoto Protocol Implementation Act*, this Plan fulfills the following legal requirements:

Section 5 of the *Act* provides that "Within 60 days after this *Act* comes into force and not later than May 31 of every year thereafter until 2013, the Minister [of the Environment] shall prepare a Climate Change Plan that includes:

> (a) a description of the measures to be taken to ensure that Canada meets its obligations under Article 3, paragraph 1, of the Kyoto Protocol, including measures respecting:
> i) regulated emission limits and performance standards,
> ii) market-based mechanisms such as emissions trading or offsets,
> iii) spending or fiscal measures or incentives,
> iii.1) a just transition for workers affected by greenhouse gas emission reductions, and
> iv) cooperative measures or agreements with provinces, territories or other governments.
>
> (b) for each measure referred to in paragraph (a),
> i) the date on which it will come into effect, and
> ii) the amount of greenhouse gas emission reductions that have resulted or are expected to result for each year up to and including 2012, compared to the levels in the most recently available emission inventory for Canada;
>
> (c) the projected greenhouse gas emission levels in Canada for each year from 2008 to 2012, taking into account the measures referred to in paragraph (a), and a comparison of those levels with Canada's obligations under Article 3, paragraph 1, of the Kyoto Protocol;
>
> (d) an equitable distribution of greenhouse gas emission reduction levels among the sectors of the economy that contribute to greenhouse gas emissions"

Additional requirements

Two additional requirements under section 5 of the Act are addressed in the 2009 Plan. Paragraphs (e) and (f) of section 5 (1) stipulate that the Government must publish:

> "(e) a report describing the implementation of the Climate Change Plan for the previous calendar year; and
>
> (f) a statement indicating whether each measure proposed in the Climate Change Plan for the previous calendar year has been implemented by the date projected in the Plan and, if not, an

explanation of the reason why the measure was not implemented and how that failure has been or will be redressed."

Section 9 requires that the Minister of the Environment prepare, within 120 days after the Act comes into force, a statement setting out the greenhouse gas emission reductions that are reasonably expected to result for each year up to and including 2012 from each regulation and measure. No similar requirement exists for any of the Plans following the 2007 Plan. To review the Statement, please see the 2007 Climate Change Plan.

This document constitutes the Climate Change Plan for 2009 that the Government is required to publish under Section 5 of the *Kyoto Protocol Implementation Act.*

Continuous Cycle of Improvement

Section 10 of the *Kyoto Protocol Implementation Act* requires the National Round Table on the Environment and the Economy (NRTEE) to review each annual Climate Change Plan within 60 days after it is published. Additionally, the Commissioner of the Environment and Sustainable Development (CESD) is required to prepare a report on the Plans at least once every two years. At present, the NRTEE has provided reviews of the 2007 and 2008 Plans and the CESD's first review was recently completed. While the Government has not agreed with all of the recommendations made in these reviews, it has adapted each Climate Change Plan and improved reporting based on a number of the recommendations.

In the first KPIA Plan in 2007, the Government provided individual emissions reductions for each measure as required by the Act. In its first review, the NRTEE recommended that the Government also report on the measures in an integrated fashion to account for any interaction effects between programs that could result in an overstatement of reductions. The Government responded to this recommendation in the 2008 Plan by providing an integrated reporting of measures using a modeling approach, as well as reporting the expected reductions for each measure consistent with the requirements of the Act. As a result, the Plan's overall integrated estimate will be different from the aggregate of the individual measures because it accounts for interaction effects. NRTEE welcomed this methodological change by noting that the 2008 Plan was a "significant improvement" from the 2007 Plan.

The cycle of improvement continues in the 2009 Plan with the inclusion of further refinements as suggested by the CESD. For example, greater detail is provided on the implementation status of the measures to which emission reductions are attributed during the Kyoto Protocol period. The Plan also provides greater detail in support of the Government's positions on two of the Act's requirements – provisions for a just transition for workers affected by measures in the Plan, and efforts to ensure an equitable distribution of emission reductions across sectors of the economy. Finally, the 2009 Plan provides uncertainty analysis for the reduction numbers for most of the measures, including a range of emissions reductions outcomes.

Introduction

Climate change is the most important environmental issue facing the world today. According to the International Panel on Climate Change, the current trend of global emissions growth needs to be reversed and put on a downward trajectory in order for the world to avoid catastrophic consequences of climate change.

The path for Canada is clear and it requires us to address climate change by responsibly reducing our greenhouse gas emissions through policies that commit us to domestic, continental, and international actions. All of Canada's actions to confront climate change will be undertaken with careful regard to the country's economic circumstances and with the understanding that as Canada's major trading partners, principally the United States, act on climate change, Canada is also moving forward with similar actions.

Since the Government's last Climate Change Plan for the purposes of the *Kyoto Protocol Implementation Act*, released in May 2008, two major developments have occurred – the global economic downturn and the election of a new Administration in the United States committed to taking action on climate change. Canada's approach to climate change must reflect the realities and opportunities associated with both of these developments. The Government is currently adjusting and strengthening its approach to regulating greenhouse gas emissions in the industrial sector in response and will announce the details of this approach later this year. The Government has a long-term vision, one that sees Canada mastering clean technologies, such as carbon capture and storage and successfully developing a range of clean energy alternatives.

In the November 19, 2008 Speech from the Throne, the Government announced its commitment to work with provincial and territorial governments, as well as other partners to develop and implement a North America-wide cap and trade system for greenhouse gases. The Government also re-committed to the national objective of a 20% absolute reduction in greenhouse gas emissions from 2006 levels by 2020. To achieve this long-term success, the Government is implementing a balanced and sustainable approach and the upcoming changes to the climate change approach will ensure that we are on track to meet our targets. Canada's domestic action will aim to reduce carbon emissions at their sources, which will involve improving the orderly transformation of capital energy stock to less carbon-intensive alternatives such as natural gas and non-emitting sources such as nuclear and hydro.

Ensuring the adoption of clean energy technologies is critical to meeting these targets and, as such, is a key focus of the Government of Canada. Canada's Economic Action Plan commits $1 billion to clean energy research and demonstration projects, which, along with the efforts of Canada's provinces and territories, will help to enhance our ability to make use of the country's vast energy reserves without harming the environment.

Moreover, while 73% of Canada's electricity is generated by non-emitting sources such as hydro, nuclear and wind; the Government has set an objective of boosting this number to 90% by 2020. The Government is also taking action to reduce emissions from the transportation sector by regulating the tailpipe carbon dioxide emissions from cars and light trucks. Further, energy conservation is critical and reducing Canada's emissions must also involve changes in how we consume and conserve energy in the country's homes and offices.

The effort to reduce Canada's greenhouse gas emissions can only be successful if conducted in a global context. Canada's most crucial international relationship, especially in the context of climate change, is with the United States, given that our two countries share the world's largest continental energy economy, as well as an environmental space.

In February 2009, Prime Minister Harper and President Obama agreed to begin a Clean Energy Dialogue, the most significant development in continental, environmental and energy policy since the North American Free Trade Agreement. The Clean Energy Dialogue will focus on three critical areas: expanding clean energy research and development; developing and deploying clean energy technology; and, building a more efficient electricity grid based on clean and renewable generation.

Along with this continental approach, Canada is committed to working with the international community through the United Nations Framework Convention on Climate Change (UNFCCC) to produce a new international protocol to reduce carbon emissions at the December 2009 climate conference in Copenhagen, Denmark. Canada is participating in the Major Economies Forum launched by the United States to facilitate a candid dialogue among key developed and developing countries to help generate the political leadership necessary to achieve a successful outcome in Copenhagen.

Canada is actively and constructively engaged in ongoing negotiations toward a new international agreement and maintains the position that a new agreement should balance environmental and economic concerns, maintain a long-term focus, promote the development and deployment of low-carbon technologies and engage all major economies.

This Plan outlines many of the existing domestic actions that the Government of Canada is taking to reduce the country's greenhouse gas emissions. These actions will be supplemented with additional efforts that will be introduced this year and will be coupled with progress in working continentally and internationally to respond to the challenges of climate change and clean energy.

Canada's Kyoto Protocol Targets and Obligations

Canada's Commitments under the United Nations Framework Convention on Climate Change and the Kyoto Protocol

The **United Nations Framework Convention on Climate Change** is the key multilateral environmental agreement through which national governments are cooperatively addressing climate change. The ultimate objective of the Convention is to achieve stabilization of greenhouse gas concentrations in the atmosphere at a level low enough to prevent dangerous human interference with the climate system. A total of 192 countries have ratified the Convention, which entered into force in 1994.

The **Kyoto Protocol** to the UNFCCC, which entered into force in 2005, commits signatory countries (Annex B Parties) to individual targets to limit or reduce their greenhouse gas emissions. Under the terms of the Kyoto Protocol, 38 developed countries, including Canada, made commitments that would cut their total emissions of greenhouse gases on average between 2008 and 2012 to levels 5% below 1990 levels. Canada's target is an average of 6% below 1990 levels over the 2008-2012 period.

Canada has met, and will continue to meet, a series of requirements under the Kyoto Protocol. These include: providing financial assistance to developing countries so that they may endeavour to meet their commitments; submitting periodic "national communications" that include additional information to the information submitted to the UNFCCC; submitting a one-time "Initial Report under the Kyoto Protocol" to facilitate the operation of the first commitment period and describe the required infrastructure that Canada has in place; and, submitting a one-time "Report on Demonstrable Progress under the Kyoto Protocol" outlining the initiatives put in place in Canada to achieve its commitments under the Protocol.

Along with these submissions, Canada has also established a national inventory system for measuring and reporting emissions and removals of greenhouse gases and is establishing a national registry. The registry serves as a tracking system to ensure accurate accounting of the initial issuance of the amount of greenhouse gas emissions allowed in Canada, and the subsequent international transactions undertaken with other countries.

While Canada remains committed to meeting its reporting requirements under the UNFCCC and Kyoto Protocol, the focus of Canadian action on climate change is not on the remaining years of the Kyoto Protocol period. The world is now turning the page on Kyoto and is focused on reaching a new agreement in Copenhagen in December 2009. As the National Round Table on the Environment and the Economy notes in its response to the 2008 Plan, "climate change mitigation through emissions reductions is really a long-term problem."

The Government of Canada strongly agrees with the NRTEE's assessment. Although the UNFCCC entered into force in 1994, it is only in recent years that programs and policies have been put in place to begin to reduce Canada's emissions, and their benefits will not be fully felt during the Kyoto period. That is why Canadian action on climate change is focused on the future; on meeting the goal of a 20% reduction in greenhouse gas emissions from the 2006 level by 2020, and a 60% to 70% reduction from the 2006 level by 2050.

Timelines for Compliance with the Kyoto Protocol

The first commitment period of the Kyoto Protocol began January 1, 2008, and ends December 31, 2012. Kyoto Protocol Annex B Parties are required to submit their annual greenhouse gas emissions data in the form of a national inventory report, the first of which will be due on April 15, 2010, with the final report for 2012 due on April 15, 2014. The degree to which a Party signatory has met its emissions reduction obligations under the Kyoto Protocol will be assessed after its final report has been filed in 2014.

An Expert Review Team will examine and record each country's total emissions for the commitment period (2008-2012), along with final accounting quantities for land use, land-use change and forestry activities. Once the Expert Review process has been completed for all Parties, a 100-day "additional period for fulfillment of commitments" will begin. This period is intended to provide Parties with the opportunity to undertake and finalize the transactions necessary to achieve compliance with Article 3, paragraph 1, of the Kyoto Protocol. The specific date when the 100-day period begins will be determined by the Conference of the Parties to the Kyoto Protocol prior to 2014. Canada is engaged on an ongoing basis in these issues through standard UNFCCC processes.

Canada's Greenhouse Gas Emissions

Canada's greenhouse gas emissions continue on a gradual upward trend even as numbers fluctuate on a year to year basis. Overall emissions declined in 2006, shifted upward in 2007 and are expected to level off or decline again in 2008 and 2009 due to a number of factors such as weather patterns and the economic downturn.

According to the latest National Greenhouse Gas Inventory, total greenhouse gas emissions in Canada in 2007 were about 747 megatonnes (Mt) CO_2 eq, an increase of 4% from 2006 (718 Mt).[1]

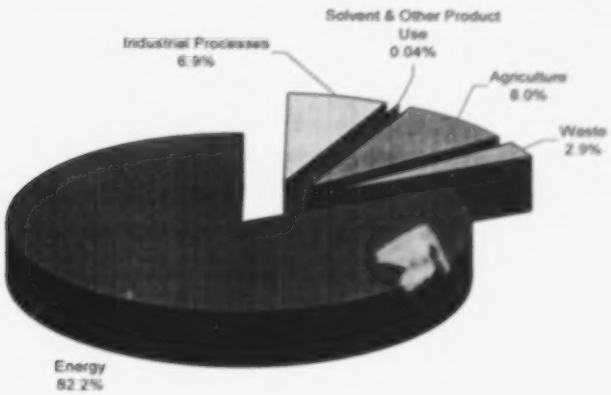

Figure S-3: Sectoral Breakdown of Canada's GHG Emissions, 2007

The growth in emissions from 2006 can be largely attributed to a significant increase (6%) in emissions from fossil fuel production, a 7.7% increase in emissions from electricity & heat generation, a 38.5% increase in the emissions from mining, and a 9.5% increase in emissions from residential (heating).

On a national average, the winter of 2007 was colder than that of 2006. Heating degree days (a measure of the amount of energy required for heating buildings) increased by 10%, leading to a similar growth in the requirement of heating fuel, and as a result, growth in greenhouse gas emissions from the residential and commercial sectors. Transport emissions also rose due to increased use of sport utility vehicles, vans, pick-up trucks and heavy duty diesel freight trucks, as well as off-road vehicles (primarily for the mining and oil and gas industries).

As a result of the global economic recession, the pace of economic growth over the remainder of the Kyoto Protocol period is uncertain and difficult to forecast. However, Canada's greenhouse gas emissions are expected to remain relatively stable or trend downward during the 2008 and 2009 period due to the economic slowdown, but will start to rise thereafter[2], though at a slower rate than

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[1] Information on Greenhouse Gas Sources and Sinks: Canada's 2007 Greenhouse Gas Inventory - A Summary of Trends

[2] Business as usual levels refer to the expected levels of economic growth and energy demand that would exist if no new action were to be taken to reduce greenhouse gas emissions.

previously forecasted. With no new actions from governments or industry to control emissions growth, Canada's greenhouse gas emissions would average some 757 Mt per year between 2008 and 2012.

Of note, in 2008, Canada's official emission totals for all inventory years (1990-2006) were reduced by approximately 4-5 Mt as a result of methodological improvements recommended by the UN Expert Review team in February 2008. Additional methodological changes were made for the 2009 submission, with methodological changes leading to a slight decline in emissions reported for the 2004-2006 period as compared to those reported in 2008. The overall trend since 1990, however, remains unchanged.

While there have been relatively minor and short-lived dips in Canada's historical emissions (for example, in 1991 due to an economic recession, and in 2001 due to the impacts of the terrorist attacks of September 11, 2001), in general, emissions have grown at an average rate of 1.5% from 1990 to 2005.[3]

Canada's Kyoto Protocol Target

In accordance with the UNFCCC, an Expert Review Team (ERT) reviewed Canada's initial report during a visit to Ottawa in November 2007. On February 18, 2008, the ERT sent an assessment with recommended methodological improvements that, as noted earlier, resulted in a downward revision of emissions about 4-5 Mt for each year of the 1990 to 2004 period.

In the initial report, Canada's Kyoto Protocol base year (1990) emissions were estimated to be 599 Mt. Canada's 1990 emission have been subsequently been revised downward again to 592 Mt. However, under the terms of the Kyoto Protocol, Canada's target was frozen at a 6% reduction from 1990 levels as calculated last year. As a result Canada's Kyoto Protocol target (or its "assigned amount") remains as it was stated in last year's report – 2,792 Mt for the five-year commitment period.

[3] Initial Report Review 1990-2005

Actions to Address Climate Change

The Government of Canada is committed to stopping the increase in Canada's greenhouse gas emissions and drastically reducing them. The Government of Canada has established a national target of an absolute 20% reduction in greenhouse gases, relative to the 2006 level, by 2020. Under current forecast assumptions total reductions required to meet this target will be in the range of 280 Mt in 2020. Over the longer term, the Government is committed to achieving a 60 to 70% reduction from the 2006 level by 2050.

To achieve these reductions, the Government is continuing to work to develop a regulatory regime that will achieve real emissions reductions in Canada and contribute to the achievement of the national 2020 target. Moreover, the Government will set mandatory standards that will reduce the carbon dioxide emissions from automobiles and be consistent with the national fuel economy standards announced by the United States for the 2011 model year. It is also implementing a variety of program initiatives designed to encourage the development, demonstration and deployment of clean technologies. Along with the measures outlined in the 2008 version of this Plan, the Government is implementing new actions that will ensure reductions in greenhouse gas emissions over the long term. These include the new Clean Energy Fund to improve the development of clean technologies such as carbon capture and storage, the Green Infrastructure Fund, and new investments to enhance Canada's ability to produce nuclear-generated electricity.

The Government's domestic climate change agenda will continue to evolve over time. This Plan includes those programs and policies announced and funded as of May 1, 2009. While the Plan provides contextual information on new climate change measures, emissions reductions estimates are only provided for those measures that are expected to result in emissions reductions during the Kyoto period, as per the requirements of the *Kyoto Protocol Implementation Act*.

Pursuant to the requirements of paragraph 5 (1) (a) (iii.1) of the Act regarding measures respecting a just transition for workers affected by greenhouse gas emission reductions, the Government has considered the requirement and determined that the implementation of regulatory or other measures proposed in this Plan will not require significant worker adjustment in regulated industries.

Similarly, paragraph 5 (1) (d) of the Act requires the Government to ensure "an equitable distribution of greenhouse gas emission reduction levels among the sectors of the economy that contribute to greenhouse gas emissions". The analysis conducted by the Government indicates that there will not be any notable inequities among sectors.

In response to the CESD audit, additional details pertaining to the projected employment levels and greenhouse gas emission reduction levels among economic sectors are identified in Annex 3.

The Regulatory Framework for Industrial Greenhouse Gas Emissions

The following provisions address the requirements of paragraphs 5 (1) (a) (i) and (ii) of the *Kyoto Protocol Implementation Act* as well as paragraphs 5 (1) (b) (i) and (ii), (e) and (f).

Note on the Regulatory Framework for Industrial Greenhouse Gas emissions

In April 2007 the Government released the Regulatory Framework for Industrial Greenhouse Gas Emissions and updated it in 2008 as set out in the *Turning the Corner* plan. Earlier this year the Government indicated that it was refining this approach to reflect the new realities of the global economic downturn and the opportunities represented by a new Administration in the United States. The Government has committed to releasing detailed plans by year's end.

Significant consultations are required before an updated industrial regulatory regime can be finalized. Given the KPIA deadlines for reporting, the 2009 Plan cannot reflect the new regulatory approach. Therefore, to comply with the Act, this Plan includes the expected emissions reductions for the industrial regulations as described in *Turning the Corner,* though the final regulatory regime will differ from *Turning the Corner.*

The Regulatory Framework for Industrial Greenhouse Gas Emissions has two key components: (1) stringent and mandatory short, medium and long term emissions reduction targets, relative to 2006 emissions; and, (2) compliance mechanisms that provide firms with flexibility in how they meet their targets.

Greenhouse Gas Emission Reduction Targets

The finalized Framework set an initial required reduction of 18% from 2006 emission intensity levels in 2010 for existing facilities. Every year thereafter, a 2% continuous improvement in emission intensity will be required. By 2015, therefore, an emission-intensity reduction of 26% from 2006 levels will be required, with a further reduction to 33% by 2020. The emission-intensity approach ties the emission reduction targets to production. This allows emission reductions to be achieved while supporting economic growth.

New facilities, which are defined as those whose first year of operation is 2004 or later, will be granted a three-year commissioning period before they will face an emission-intensity reduction target. After the third year, new facilities will be required to improve their emission intensity each year by 2%. A cleaner fuel standard will be applied, thereby setting the target as if they were using the designated fuel. A flexible approach will be taken in special cases where the equipment or technology used in a new plant facilitates carbon capture and storage or otherwise offers a significant and imminent potential for emission reductions.

For both existing and new facilities, fixed process emissions, which are emissions tied to production and for which there is no alternative reduction technology, will receive a 0% target in the regulations. In other words, for these types of emissions, there is no way, with current technology, for them to be reduced except by shutting down production.

The *Regulatory Framework* released in 2008, included several new provisions which were not a part of the April 2007 announcement:

- All oil sands upgraders and in-situ plants that come into operation in 2012 or after will be required to meet a stringent target based on the use of carbon capture and storage by 2018.
- All coal-fired electricity plants that come into operation in 2012 or after will be required to meet a stringent target based on the use of carbon capture and storage by 2018.
- The federal Government will establish a clean electricity task force to work with Canada's provinces and territories, as well as with industry to meet an additional 25 Mt reduction goal from the electricity sector by 2020.

Complying with Regulated Targets

In order to promote investments in important green technologies and facilitate the transition from intensity-based to hard emissions caps, firms can comply with the regulations either by reducing their own emissions through abatement actions or by making use of one of the Framework's compliance mechanisms, detailed below.

Inter-firm trading: Firms whose actual emission intensity in a given year is below their target will receive tradable credits equal to the difference between their target and their actual emission intensity, multiplied by their production in that year. These credits can be banked for future use or sold to other parties, including other regulated firms.

Offset System: Offsets are projects that result in incremental real, verified domestic reductions or removals of greenhouse gas emissions in activities that are not covered by the federal greenhouse gas regulations. These projects will generate credits that firms can use for compliance purposes.

Clean Development Mechanism: Firms can use certain credits from the Kyoto Protocol's Clean Development Mechanism. Access to these credits for compliance purposes will be limited to 10% of each firm's total target.

One-time credit for early action: Firms that took verified action between 1992 and 2006 to reduce their greenhouse gas emissions will be eligible to apply for a share of a one-time credit for early action. A maximum of 15 Mt worth of credits will be allocated, with no more than 5 Mt to be used in any one year. Firms will be required to submit evidence of changes in processes or facility improvements they had undertaken that resulted in verifiable, incremental greenhouse gas emission reductions. The maximum allocation for emission reductions will be one credit for each tonne of carbon dioxide equivalent reduction. If the total tonnage of emission reductions applied for were to exceed 15 Mt, the credits will be distributed to individual firms in proportion to their contribution to the total emission reduction achieved.

Pre-certified investments: As an alternative to contributing directly to the technology fund, under the pre-certified investment option, a firm will be eligible to receive credits for investing directly in large-scale and transformative projects, either its own or joint-venture projects, selected by the firm from a menu set out by the federal Government.

Pre-certified investments will have the same contribution rate as the technology fund and will be subject to equivalent criteria and requirements, including ownership provisions.

To facilitate the implementation of carbon capture and storage in new facilities, the Government will start discussions with industry, as well as the Governments of Alberta and Saskatchewan, to pre-certify carbon capture and storage projects. The use of such pre-certified investments will ensure that funds from such sectors as oil and gas will be dedicated to emission reductions from those sectors.

In addition, given the significant potential for carbon capture and storage to reduce emissions and in order to encourage investment in such projects, contributions of up to 100% of a firm's regulatory obligation in these pre-certified projects will qualify for credits up to 2018. This provision will be limited to firms that can make direct use of carbon capture and storage technology in the following sectors: oil sands, electricity, chemicals, fertilizers, and petroleum refining.

Unintentional fugitive methane emissions from sources such as equipment leaks and storage from the upstream oil and gas and oil sands sector and natural gas transmission, distribution, and storage facilities were not identified as covered sources in the April 2007 framework. Reduction requirements for these sources will be implemented through regulated codes of practices. Likewise, regulated codes of practices will be implemented to reduce hydrofluorocarbon emissions from industrial processes and industrial product use and from other applications, such as refrigeration, and air conditioning.

Technology fund: Firms can obtain credits for compliance purposes by contributing to a technology fund. The fund will be a means to promote the development, deployment, and diffusion of technologies that reduce emissions of greenhouse gases across industry. A third-party entity, at arm's-length from Government, will be created to administer the fund. A key principle is that there will be no inter-regional transfer of wealth.

Contributions to the deployment-and-infrastructure component of the fund, aimed at investments with a high likelihood of yielding greenhouse gas emission reductions in the near term, will be limited to 70% of the target in 2010, falling to 65% in 2011, 60% in 2012, 55% in 2013, 50% in 2014, 40% in 2015, 10% in 2016, and 10% in 2017. No further contributions will be accepted after 2017. The research and development component, which will focus on projects aimed at supporting the creation of transformative technologies, will be limited to 5 Mt each year, also ending after 2017.

From 2010 to 2012, the contribution rate for the fund will be $15 per tonne of carbon dioxide equivalent. In 2013, the contribution rate will be $20 per tonne. Thereafter, the rate will escalate yearly at the rate of growth of nominal GDP until 2017.

Putting emissions on a long-term downward trend will require a strong commitment to the development and deployment of clean energy technologies, such as carbon capture and storage. The Technology Fund will establish a significant pool of capital targeted on advancing the clean energy technology essential to achieving emissions reductions, while maintaining economic growth.

Expected reductions from the Regulatory Framework presented in this report represent the total emission reduction obligations required of industry under the Regulatory Framework. The Framework provides a number of options to industry for meeting these obligations. The Government's modeling indicates that the choice of compliance option is influenced by differences in marginal costs that they present to regulated industries and therefore, actual in-year reductions may vary from the Plan's estimates, depending on the specific compliance options chosen by individual firms. Because the Framework is market-based, it is not possible to establish with certainty which options will be most used by industry.

The regulations implemented in the Framework will establish rigorous rules for the quantification, reporting and verification of each company's emissions. Approximately 15 months after the Regulatory Framework enters into force, it will be possible to provide improved estimates regarding the actual use of each compliance option by individual firms. In the interim period, the Government will be gaining experience with the quantification, reporting and verification of domestic reductions or removals of greenhouse gas emissions in projects and activities under the Offset System.

Regulatory Framework for Industrial Greenhouse Gas Emissions					
Year	**2008**	**2009**	**2010**	**2011**	**2012**
Low	0.0	0.6	37.5	49.5	55.2
Preliminary Expected Reductions (Mt)[4]	0.0	0.9	46.6	55.3	61.6

Regulating Energy Efficiency — Strengthening Energy Efficiency Standards

The Government is in the process of amending energy efficiency regulations under the *Energy Efficiency Act*. Amendments will include the introduction of new performance requirements for 20 currently unregulated products, such as commercial clothes washers and commercial boilers, and tightened requirements for ten products, such as residential dishwashers and dehumidifiers, for which efficiency standards are already in place. Stricter regulations will lead to inefficient products disappearing from the market, leaving only the better performing items. The anticipated broadening and strengthening of the Act will allow 80% of the energy used in homes and businesses to be regulated. Consultation with provinces, territories, as well as stakeholders, was considered essential in the development of fair and meaningful standards.

As part of the Clean Air Regulatory Agenda, the first of three planned amendments to the energy efficiency regulations was published on December 24, 2008. The amendment prescribed seven new minimum energy performance standards and increased the stringency of existing standards for four products. In addition, this amendment specified regulations that will phase out the use of inefficient incandescent light bulbs in most areas of regular use by 2012. Analysis, consultation and drafting are well-advanced for the second of the planned amendments.

ENERGY STAR labeling complements the standards by leading consumers to the best performing equipment. In fact, a recent survey found that 84% of Canadian consumers who bought, or who were planning to buy home electronics say that the fact that the products are ENERGY STAR-qualified impacts their purchasing decision.

Preliminary Expected Reductions (Mt)[5]	**2008**	**2009**	**2010**	**2011**	**2012**
Expected	0.09	0.26	0.75	1.40	3.55

[4] The estimated emission reductions are based on the targets contained in the Regulatory Framework released in 2008, but adjusted to reflect the lower economic growth.

[5] Note that the expected reductions have been modified from past KPIA input as a result of changes to regulatory timing. The figures presented here are consistent with those in the Regulatory Impact Analysis Statement (December 24, 2008). As they are based on technical product and market data, the expected reductions are not presented as a range in the RIAS and therefore, shown in a similar fashion above. For more information on these energy efficiency regulations access the link below (noting that Mt figures in the RIAS refer to only Amendment 10): http://www.gazette.gc.ca/rp-pr/p2/2008/2008-12-24/html/sor-dors323-eng.html

Regulating Transportation

Reducing Greenhouse Gas Emissions from New Cars and Light Trucks

The Government is currently developing regulations under the *Canadian Environmental Protection Act, 1999* (*CEPA, 1999*) that will set mandatory standards to reduce the carbon dioxide tailpipe emissions from new cars and light trucks beginning with the 2011 model year. A Notice of Intent to initiate the development of these regulations under *CEPA, 1999* was published in Canada Gazette Part I on April 4, 2009. These regulated standards will be consistent with the national fuel economy standards for 2011 model year vehicles that were finalized by the United States on March 27, 2009. The U.S. Administration will continue to progressively tighten fuel economy standards to achieve a level of 35.5 miles per gallon by 2016 for the combined fleet of cars and light trucks.

The Government previously intended to regulate fuel consumption standards of new vehicles under the *Motor Vehicle Fuel Consumption Standards* Act. However, proceeding under this Act would have required significant changes to the Act itself, which posed the risk of delaying regulatory action. Proceeding with regulations under *CEPA, 1999* ensures that the Government has the flexibility to align with United States fuel economy regulations as they emerge, which is crucial to achieving a harmonized approach that takes both our environment and economy into account. *CEPA 1999* is a modern piece of environmental legislation with considerable flexibilities to enable timely harmonization with United States standards and also provides consistency with potential longer-term United States national approaches to improve fuel economy and reduce greenhouse gas emissions. Further, this approach is in line with other international jurisdictions that are moving to implement GHG-based vehicle regulations, notably the European Union. Finally, this approach will be consistent with the Government of Canada's existing use of *CEPA, 1999* to establish standards limiting smog-forming air pollutant emissions from new vehicles in alignment with the national standards of the United States Environmental Protection Agency (EPA).

In light of these recent developments in Canada and the United States, the development of Canadian regulations and the assessment of its impacts in Canada remain in the early stages. Therefore, emission reductions for 2011 and 2012 have not been determined at this time.

Preliminary Expected Reductions (Mt)	2008	2009	2010	2011	2012
Expected	N/A	N/A	N/A	TBD	TBD

Reducing Emissions from Rail, Air and Marine Transportation

Rail

In May 2007, Environment Canada, Transport Canada and the Railway Association of Canada signed a Memorandum of Understanding that committed industry members to take steps to align with the stringent regulatory requirements of the United States EPA. The Memorandum of Understanding (MOU) also set greenhouse gas emission intensity targets for the various rail services such as freight and passenger rail. The Government of Canada is in the process of developing regulations, under the *Railway Safety Act*, that will align with the EPA locomotive emission standards. Once the MOU expires, the voluntary approach will be replaced with a regulatory regime. The Minister of Transport will implement new regulations, under the *Railway Safety Act*, to take effect in 2011. As these regulations are not yet developed, the Government is not in a position to provide expected emissions reductions.

Air

The Government continues to support harmonized international efforts to limit or reduce both domestic and international aviation emissions of both greenhouse gases and air pollutants. The Minister of Transport supports the work of the International Civil Aviation Organization to develop international standards and recommended practices for the reduction of greenhouse gas and air pollutant emissions from aviation sources. These standards and recommended practices will be considered in the development of domestic regulations under the *Aeronautics Act*. As the standards are still being developed, the Government is not in a position to provide expected emissions reductions.

Marine

Canada is working with other countries at the International Maritime Organization to address the impacts of the international shipping sector on climate change. The Government of Canada supports the development of a stringent global greenhouse gas emissions regime that applies equally to ships of all flags, as this would reduce the likelihood of unilateral and regional actions to reduce emissions from ships and provide a uniform global policy environment for the shipping industry. Once adopted, these international standards would be implemented domestically by regulations under the *Canada Shipping Act, 2001*. In advance of such regulations, the Government of Canada is developing a Memorandum of Understanding with the shipping industry to reduce air emissions from domestic marine operations, which would be applicable to both vessels and other marine facilities operating in Canada. As the standards are still being developed, the Government is not in a position to provide expected emissions reductions.

Regulating Renewable Fuels Content

The federal Government will develop and implement a federal regulation, to be developed under *CEPA, 1999*, that would require fuel producers and importers to have an average annual renewable fuel content of at least 5% of the volume of gasoline that they produce or import. This measure is expected to come into effect in 2010.

In addition, the Government intends to put in place an additional requirement for an average 2% renewable fuel content in diesel fuel and heating oil, upon successful demonstration of renewable diesel fuel use under the range of Canadian conditions. This is intended to come into effect no later than 2012. This requirement is approximately equivalent to a renewable fuel content requirement for 5% of on-road diesel fuel.

Bill C-33, *An Act to amend the Canadian Environment Protection Act, 1999*, provides additional authorities needed to make efficient national regulations requiring renewable content in Canadian fuels. It received Royal Assent on June 26, 2008, and is expected to be come into force in June 2009.

Environment Canada has secured resources through Budget 2008 which are required to develop these regulations. Regulatory development, science and technology work, including life cycle assessment, and the demonstration projects needed to support the policy decisions around the regulations are all moving forward. The draft regulations are expected to be proposed in the *Canada Gazette*, Part I, for consultation in Fall 2009.

Preliminary Expected Reductions (Mt)	2008	2009	2010	2011	2012
Low	0	0	0.3	1.0	2.1
High	0	0	0.9	2.8	4.3
Expected	0	0	0.3	1.0	2.1

Supporting Renewable Fuels Development

While the regulation of renewable fuels content described above is the only renewable fuels measure that will directly achieve emissions reductions during the Kyoto period, the Government is supplementing these regulations with a number of program measures that make up the Government's full renewable fuels agenda. While the initiatives described below will not achieve direct reductions during the Kyoto period, they will help promote future renewable fuel technologies that are necessary to combating climate change over the long term.

The ecoENERGY for Biofuels Initiative supports the production of renewable alternatives to gasoline and diesel and encourages the development of a competitive domestic industry for renewable fuels. Through the initiative, the Government will invest up to $1.5 billion over nine years in support of biofuels production in Canada by partially offsetting the investment risks associated with fluctuating feedstock and fuel prices. The program is in its second year of operation and is fully operational. In fiscal year 2008/09, the program signed 22 contribution agreements representing a total commitment of $938 million and a volume of 1.63 billion litres of biofuels.

The ecoAGRICULTURE Biofuels Capital Initiative (ecoABC) is a $200 million initiative to provide repayable contributions of up to $25 million per project to help farmers overcome the challenges of raising the capital necessary for the construction or expansion of biofuel production facilities. It has been operational since April 2007. In 2006, the Government also established the $365 million Agricultural Bioproducts Innovation Program, which became operational in January 2007. Further, in 2006 a component was added to the Co-operative Development Initiative to focus on biofuels and value added activities for agricultural production.

In 2006 the Government also announced the Biofuels Opportunities for Producers Initiative, which assisted agricultural producers in developing sound business proposals, and, undertaking feasibility or other studies to expand biofuels production capacity. The initiative ended March 2008. During the duration of the program, 121 projects were supported for a total of $18.2 million.

An additional $500 million is being provided to Sustainable Development Technology Canada to invest with the private sector in establishing large-scale facilities for the production of next-generation renewable fuels.

Budget 2008 also made investments in the development of renewable fuels in Canada. The Government provided $10 million over two years for scientific research and analysis on biofuels emissions to support regulations development and demonstration projects to verify that renewable diesel fuel is safe and effective for the Canadian climate. Budget 2008 also provided funding to establish a pilot program to demonstrate E85 fuelling infrastructure and promote its commercialization. E85 is a renewable fuel containing 85% ethanol and 15% gasoline.

ecoACTION Investments

As a means to support these regulatory actions and further reduce greenhouse gas emissions, the Government is investing in a series of ecoACTION programs intended to promote the development and deployment of new technologies. This section outlines ecoACTION programs including ecoENERGY and ecoTRANSPORT. The emissions reductions ranges provided for each of these measures are based on variability in factors relating to program implementation. Generally, the Government reports the lowest or average figure in the range to provide the most conservative

estimate of program impacts. The methodology used to calculate the emissions reduction ranges attributed to each ecoACTION investment is referenced in Annex 2. In addition, Annex 2 provides uncertainty analysis in relation to the methodology in response to recommendations made by the Commissioner for the Environment and Sustainable Development.

The following sections detailing ecoACTION investments address the requirements of paragraph 5(1)(a)(iii) of the *Kyoto Protocol Implementation Act* as well as paragraphs 5 (1)(b)(i) and (ii), (e) and (f).

ecoENERGY Initiatives

ecoENERGY Technology Initiative

The ecoENERGY Technology Initiative (ecoETI) is investing $230 million over five years (2007-12) in the research, development and demonstration of clean transformational energy technologies and systems. Given the longer term nature of this project, the investment is expected to lead to reductions in greenhouse gas emissions in the post-2012 period. The Initiative is directed towards increasing clean energy supplies, reducing energy waste and reducing pollution from conventional energy. The program came into effect in October 2007, with the announcement of funding for the clean coal technology project. (Note: a one-year extension was approved to the original four-year profile. Therefore the ecoEnergy Technology Initiative will terminate in March 2012)

The new technologies will be expected to lead to significantly reduced emissions of particulates, gaseous pollutants, toxic substances and greenhouse gases from the production and use of energy. Given the long-term nature of research and development, and the many factors that come into play for the adoption of leading edge technologies, firm quantitative estimates of air pollutant and greenhouse gas emission reductions are not possible.

The ecoENERGY Technology Initiative is in its second year of operation and has fully allocated its funding to approved projects and initiatives. In fiscal year 2008/09, ecoETI completed a call for carbon capture and storage proposals and announced it was proceeding to negotiate contribution agreements for eight new carbon capture and storage research and development and demonstration projects ($140 million). In addition, work continued on a number of energy research and development and demonstration projects commenced in 2007/08 or earlier, including the Canadian Hydrogen Airport, EPCOR IGCC and Weyburn-Midale demonstration projects.

This program has been implemented by the projected date. There are no quantified emissions reductions associated with this initiative. It supports Canada's actions to reduce GHG emissions by accelerating the development and market readiness of technology solutions in clean energy.

ecoENERGY for Renewable Power

The ecoENERGY for Renewable Power program is investing $1.48 billion to provide incentives to increase Canada's supply of clean electricity from renewable sources such as wind, biomass, low-impact hydro, geothermal, solar photovoltaic and ocean energy. The program will provide an incentive of 1 cent/kWh for up to 10 years to qualifying projects. The program came into effect on April 1, 2007 as projected, and as of March 31, 2009, 52 contribution agreements had been signed with proponents, representing about $900 million in federal funding over 10 years and 2700 MW of renewable power capacity.

Analysis shows that, dependent on a number of factors, emission reductions attributed to the ecoENERGY for Renewable Power program could range from 6.0 to 6.67 Mt by 2012. The table below indicates the amounts that the Government anticipates the program will achieve.

Preliminary Expected Reductions (Mt)	2008	2009	2010	2011	2012
Low	1.7	2.8	4.5	6.0	6.0
Expected	2.2	3.74	5.45	6.67	6.67

ecoENERGY for Renewable Heat

The ecoENERGY for Renewable Heat initiative is investing approximately $36 million over four years in incentives and industry development to support the adoption of clean renewable thermal technologies such as solar air and solar hot water for water and space heating in buildings. The program achieves GHG reductions by encouraging individuals and organizations to use renewable solar thermal systems.

Since the program's inception, as projected on April 1, 2007, 727 funding applications from industrial, commercial and institutional sectors to install solar air and solar hot-water systems have been received, and 502 contribution agreements with successful applicants, representing about $9 million in federal funding have been signed. In addition, Contribution Agreements with 15 partners (utilities, developers and buyers' groups) to run pilot projects that will test ways to deploy solar hot water systems in the residential sector have been signed. Under the pilot projects, up to 8000 solar water-heating systems will be installed in Canadian homes by the end of the program. Also under the ecoEnergy for Renewable Heat program, the Government has entered into Information Sharing Agreements with Ontario, Saskatchewan and British Columbia to coordinate complimentary solar thermal programs and has also entered into agreements with two renewable energy industry associations and two other groups to improve training and certification of solar and geoexchange industry professionals.

Analysis shows that, dependent on a number of factors, emission reductions attributed to the ecoENERGY for Renewable Heat program could range from 0.017 Mt to 0.025 by 2012. The table below indicates the amounts that the Government anticipates the program will achieve.

Preliminary Expected Reductions (Mt)	2008	2009	2010	2011	2012
Low	0.003	0.007	0.012	0.017	0.017
High	0.005	0.01	0.016	0.025	0.025
Expected	0.005	0.01	0.015	0.02	0.02

ecoENERGY for Buildings and Houses

The ecoENERGY for Buildings and Houses program is investing $60 million over four years to encourage the construction and operation of more energy-efficient buildings and houses through a range of complementary activities. The Buildings and Houses program has started its third year of operation and is fully implemented. In fiscal year 2008/09, activities in such areas as the new National Energy Code for Buildings, the development of a building benchmarking/labeling program and a building recommissioning program as well as energy management training and capacity building occurred.

Specific efforts include, but are not limited to: implementing new design tools and training programs (e.g., Dollars to $ense workshops, workshops on new building design simulation and RetSCREEN); updating building energy benchmarking, rating and labelling; promoting labelling systems for housing (e.g., EnerGuide Rating System), engaging in ongoing dialogue and co-operation with provincial and territorial programs; increasing awareness of energy efficiency practises of building owners and managers through continuous building optimization; and establishing and maintaining partnerships to encourage energy efficiency capacity building.

In fiscal year 2008/09, 24 service organizations were licensed to deliver programs at the local/regional level and four other strategic partnerships were developed to continue market transformation activities. As well, over 11,500 new homes and 257,000 existing houses were labeled and more than 4300 housing professionals, builders, and energy advisors were trained. Since program inception, approximately 0.773 Mt of GHG emission savings can be attributed to this initiative (as per end of 2008/09, data yet to be finalized).The ecoENERGY for Buildings and Houses measure came into effect on April 1, 2007, and was implemented by the projected date.

Analysis shows that, dependent on a number of factors, emission reductions attributed to the ecoENERGY for Buildings and Houses program could range from 2.02 to 2.24 Mt by 2012. The table below indicates the amounts that the Government anticipates the program will achieve.

Preliminary Expected Reductions (Mt)	2008	2009	2010	2011	2012
Low	0.32	0.56	1.13	1.57	2.02
High	0.36	0.62	1.26	1.74	2.24
Expected	0.32	0.56	1.13	1.57	2.02

ecoENERGY Retrofit Initiative

The ecoENERGY Retrofit Initiative provides incentives for energy efficiency improvements in homes and in small and medium-sized organizations in the institutional, commercial and industrial sectors.

The ecoENERGY Retrofit for Homes provides home and property owners with grants up to $5,000 per unit to offset the cost of making energy efficiency improvements. The Retrofit for Homes program involves residential energy efficiency assessments by certified energy advisors and is complemented by a suite of provincial programs.

The ecoENERGY Retrofit for Homes program is in its third year of operation and is fully implemented. An additional $300 million was allocated to the ecoENERGY Retrofit for Homes program through the 2009 federal budget bringing the total budget for this element to $460 million over four years. As of the end of fiscal year 2008/09, grants to 94,000 homeowners have been made to support energy efficiency upgrades that will reduce their annual energy consumption by about 23% and GHG emissions by approximately 3.4 tonnes per house per year (as per end of 2008/09, data yet to be finalized).

The ecoENERGY Retrofit for Small and Medium Organizations ($40 million over five years) provides financial incentives to facilities meeting specified criteria based on the estimated amount of energy saved by retrofit activities. The ecoENERGY Retrofit for Small and Medium Organizations has started its third year of operation and is fully implemented. As of the end of fiscal year 2008/09, 351 contribution agreements have been signed. Thus far, approximately 77 kt of GHG emission savings can be attributed to this initiative (as per end of 2008/09, data yet to be finalized).

The ecoENERGY Retrofit included $20 million in 2007-08 for the Existing Buildings Initiative which promoted behavioural changes and energy-saving retrofits to improve energy efficient practices through financial incentives, partnerships, training and advice.

The ecoEnergy Retrofit Initiative came into effect on April 1, 2007 and was implemented by the projected date. Analysis shows that, dependent on a number of factors, emission reductions attributed to the ecoENERGY Retrofit Initiative program could range from 1.58 to 1.88 Mt by 2012. The table below indicates the amounts that the Government anticipates the program will achieve.

Preliminary Expected Reductions (Mt)	2008	2009	2010	2011	2012
Low	0.45	0.65	1.15	1.58	1.58
High	0.51	0.74	1.32	1.88	1.88
Expected	0.46	0.67	1.20	1.66	1.66

ecoENERGY for Industry

The ecoENERGY for Industry program is investing $18 million over four years to encourage information-sharing on new technologies and best practices in energy use, as well as training and specialized assessments for energy managers to identify and implement energy-saving projects.

The program is an industry-government partnership delivered through the Canadian Industry Program for Energy Conservation (CIPEC). CIPEC encourages industrial energy efficiency improvements and reductions in GHG emissions through a number of voluntary activities, including: Dollars to $ense energy management workshops, site-specific industrial energy assessment incentives, and recognition programs for industrial energy-efficiency leaders.

The ecoENERGY for Industry program is in its third year of operation and is fully implemented. As of the end of fiscal year 2008/09, this program has helped Canadian industry save 7.6 PJ of energy and avoided 736 kt of GHG emissions. This has been realized through the CIPEC and site-specific energy assessments (as per end of 2008/09, data yet to be finalized). This program took effect April 1, 2007 and was implemented by the projected date.

Analysis shows that, dependent on a number of factors, emission reductions attributed to the ecoENERGY for Industry program could range from 0.4 to 1.7 Mt by 2012. The table below indicates the amounts that the Government anticipates the program will achieve.

Preliminary Expected Reductions (Mt)	2008	2009	2010	2011	2012
Low	0.17	0.27	0.37	0.40	0.40
High	0.74	1.17	1.59	1.70	1.70
Expected	0.17	0.27	0.37	0.40	0.40

ecoTRANSPORT Initiatives

ecoAUTO Rebate Program

The ecoAUTO Rebate Program, administered by Transport Canada and delivered in partnership with Service Canada provided a cash incentive to Canadians to help the environment by buying or leasing more fuel-efficient vehicles. Through this initiative, the federal Government offered rebates from $1,000 to $2,000 towards the purchase or lease (12 months or more) of new fuel-efficient vehicles for the model years 2006, 2007 and 2008. Only new eligible vehicles purchased or leased between March 20, 2007 and December 31, 2008, and for which a rebate application form was received by March 31, 2009, qualified for the rebate.

Under this measure, vehicles whose combined fuel consumption (55% city, 45% highway) is at or below the program's fuel consumption targets of 6.5 l/100km for cars and 8.3 L/100km for light trucks were eligible for a rebate of up to $2,000. Flex-fuel passenger vehicles, which are capable of operating with either gasoline or a fuel blend of 15% gasoline and 85% ethanol (E85), received a rebate of $1,000 if their E85 combined fuel consumption rating was no more than 13.0 L/100km. The full rebate schedule is as follows:

Range of Combined Fuel Consumption (L/100km)	Passenger Cars	Light-Duty Trucks	Flex-Fuel Vehicles E85 CFCR
5.5 or less	$2,000	$2,000	$1,000
5.6 – 6.0	$1,500	$2,000	$1,000
6.1 – 6.5	$1,000	$2,000	$1,000
6.6 – 7.3	$0	$2,000	$1,000
7.4 – 7.8	$0	$1,500	$1,000
7.9 – 8.3	$0	$1,000	$1,000
8.4 – 13.0	$0	$0	$1,000

The measure came into effect March 20, 2007 and was implemented by the projected date. Application forms were released and the measure was fully implemented as of October 1, 2007. The measure concluded on March 31, 2009, which was the last date to submit an application form for eligible vehicles. As of April 17, 2009 the ecoAUTO Rebate Program received over 180,000 applications and issued over 168,700 rebates totalling $189.9 million. In addition, the toll-free number received over 113,500 inquiries and the program's website recorded 875,000 visits.

Analysis shows that, dependent on a number of factors, emission reductions attributed to the ecoAuto Rebate Program could range from 0.01 to 0.02 Mt by 2012. The table below indicates the amounts that the Government anticipates the program will achieve.

Preliminary Expected Reductions (Mt)	2008	2009	2010	2011	2012
High	0.03	0.03	0.03	0.02	0.02
Expected	0.01	0.01	0.01	0.01	0.01

Green Levy

The Green Levy applies to passenger vehicles with a fuel consumption rating of 13 litres or more per 100 kilometres (55% city and 45% highway) and is imposed at rates ranging from $1,000 to $4,000.

The Green Levy is payable by the manufacturer or importer of new vehicles delivered after March 19, 2007 and by the importer of used vehicles, if the used vehicle was originally put into service (in any jurisdiction) after March 19, 2007. The Canada Revenue Agency and the Canada Border Services Agency are responsible for the administration of the Green Levy, working with manufacturers and importers of vehicles to facilitate its application.

This program has been implemented by the projected date of March 20, 2007.

Analysis shows that, dependant on a number of factors, emission reductions attributed to the Green Levy could range from 0.23 to 0.28 Mt by 2012. The table below indicates the amounts the Government anticipates the program will achieve. More details about the methodology and assumptions used to derive the estimates for each scenario can be found in Annex 2.

Preliminary Expected Reductions (Mt)	2008	2009	2010	2011	2012
High	0.09	0.14	0.19	0.23	0.28
Expected	0.10	0.14	0.17	0.20	0.23

ecoENERGY for Personal Vehicles Initiative

The ecoENERGY for Personal Vehicles Initiative is investing $21 million over four years to provide Canadians with helpful tips and decision-making tools to assist them with buying, driving and maintaining their vehicles in a manner which reduces fuel consumption and greenhouse gas emissions. Such resources include, but are not limited to: the Fuel Consumption Guide; new driver training; and idle-free and tire inflation campaigns.

The program is in its third year of operation and nearly all components are fully implemented. Each year, over 440, 000 new drivers are trained using materials from the Auto$mart fuel efficient driving initiative. To date, the estimated GHG emission reductions associated with idle reduction and tire maintenance campaigns, and new driver training, are 0.06 Mt (as per end of 2008/09, data yet to be finalized). The report on the auto sector's achievement of the first interim goal for GHG reductions under the Memorandum of Understanding with the auto sector is being finalized.

The table below indicates the amounts that the Government anticipates the program will achieve.

Preliminary Expected Reductions (Mt)	2008	2009	2010	2011	2012
Expected	0.025	0.05	0.075	0.1	0.1

ecoMobility

The ecoMobility program is investing $10 million over four years to provide financial support to municipalities and regional transportation authorities for transportation demand management (TDM) projects that reduce emissions by shifting personal automobile travel to other modes, reducing the number and length of car trips, and shifting trips to less congested times and routes. The program will also help build national capacity to implement transportation demand management measures through research, professional development and the development of materials/resources.

National consultations were held in Summer and Fall 2007 on the design and implementation of the program. Provinces, municipalities and non-government organizations reacted positively to the

program and there is strong support. A request for proposals to initiate innovative transportation demand projects in municipalities was launched in February 2008, with 14 successful projects announced in January 2009. A second request for proposals is underway with a closing date of May 1st, 2009. Selected projects will be announced in the Fall 2009.

Complementary, national capacity building initiatives have been rolled out in 2008/09 and will continue for the remainder of the program. Examples of activities that have taken place include: development of TDM measurement guidelines; webinars; inventory of school-based TDM programs; and a bike sharing guide. More activities are planned for the upcoming fiscal year such as: technical training resources to support Active and Safe Routes to School; creation of an Active Transportation node; inventory of existing research on consumer attitudes towards active transportation; and development of training resources for practitioners on the TDM measurement guidelines. Program activities were initially delayed to accommodate extensive national consultations in the first year of the program; however activities are now under way as scheduled. The program has been extended to 2012 to allow a full three year project delivery.

Analysis shows that, dependant on a number of factors, emission reductions attributed to the ecoMobility program could range from 0.112 to 0.223 Mt in 2012.The table below indicates the amounts that the Government anticipates the program will achieve.

Preliminary Expected Reductions (Mt)	2008	2009	2010	2011	2012
High	0	0	0.217	0.220	0.223
Expected	0	0	0.109	0.110	0.112

National Vehicle Scrappage Program

The National Vehicle Scrappage Program, effective April 17, 2008, offers rewards to owners of old high-polluting vehicles (model year 1995 and older) to retire them. Program participants may choose one of: a free transit pass, memberships in a car-sharing program, a rebate on the purchase of a newer vehicle (model year 2004 and later) or $300 cash. The primary goal of the program is to reduce smog-forming emissions. Secondary goals are to reduce greenhouse gas emissions by encouraging owners of old vehicles to choose sustainable transportation alternatives (such as public transit), and preventing the release of toxic substances into the environment by ensuring the responsible recycling of vehicles.

National program implementation began in February 2009. The program is being delivered by Clean Air Foundation. In 2008, Environment Canada supported local not-for-profit organizations to deliver local scrappage programs. Full implementation across all provinces was delayed from July 2008 to February 2009. An interim approach allowing program delivery in seven provinces was used until full implementation was completed.

Analysis shows that, dependent on a number of factors, emission reductions attributed to the National Scrappage Program could range from 0.001 to 0.002 Mt by 2012. The table below indicates the amounts that the Government anticipates the program will achieve.

Preliminary Expected Reductions (Mt)	2008	2009	2010	2011	2012
Low	0.005	0.022	0.027	0.020	0.001
High	0.005	0.029	0.053	0.039	0.002
Expected	0.005	0.023	0.032	0.024	0.001

ecoTechnology for Vehicles Program

The ecoTechnology for Vehicles program is investing $15 million over four years to help to accelerate the adoption of advanced vehicle technologies that reduce greenhouse gas (GHG) emissions and promote a reduction of fuel consumption in the Canadian fleet of light-duty vehicles. This objective is achieved by acquiring and testing emerging environmental light-duty vehicle technologies, informing Canadians about these new technologies through showcasing and publications and working in partnership with industry, consumers, other Government departments and key stakeholders.

The program is fully implemented/operational. It is currently entering its third year of operation, and has recently completed evaluating and showcasing several key technologies that have the potential to reduce the environmental impacts (GHG emissions) from light-duty vehicles in Canada, including advanced diesel after-exhaust treatment systems, plug-in electric motorcycles, power assisted bicycles and variable geometry turbine turbochargers.

Over the course of 2008/09, the program attended over twenty different events across the country, and disseminated information about advanced vehicle technologies to over 75,000 Canadians via the program's public outreach events and web site (www.tc.gc.ca/eTV). To support these activities, a database of technology articles, videos and technical sheets, were developed and housed on the program's web site.

The program also partnered with several vehicle manufacturers in 2008/09 to inform the public and prepare consumers to adopt the next generation of automotive technologies. Examples of these partnerships include a full electric vehicles and a fuel cell electric vehicle, among others.

Additionally, the program continued key partnerships with industry stakeholders, including:

- *Canadian Hydrogen & Fuel Cells Association* - to identify and address barriers to the deployment of hydrogen-fuelled vehicles;
- *Various non-governmental agencies* – to develop and disseminate consumer literature to inform the public about new vehicle technologies and encourage market update; and
- *Major Vehicle Manufacturers* – to acquire, evaluate and showcase emerging technologies, e.g. Partially Zero Emissions Vehicle (PZEV) technology.

The program experienced initial delays in acquiring suitable facilities to house/store specialized vehicles (e.g. hydrogen), but has now addressed this need and the program is being implemented as scheduled.

Analysis shows that, dependant on a number of factors, emission reductions attributed to the ecoTechnology for Vehicles program could range from 0.090 to about 0.6 Mt by 2012. The table below indicates the amounts that the Government anticipates the program will achieve.

Preliminary Expected Reductions (Mt)	2008	2009	2010	2011	2012
Low	0	0.032	0.046	0.067	0.090
High	0	0.197	0.284	0.410	0.557
Expected	0	0.071	0.103	0.148	0.201

ecoENERGY for Fleets

The ecoENERGY for Fleets initiative is investing $22 million over four years to generate reductions in fuel use and related costs, air pollutants and greenhouse gas emissions through measures targeted at both operators and managers of Canada's commercial and institutional road vehicle fleets. Such measures include: training and education (e.g. SmartDriver training); sharing of best practices (e.g., Fuel Management 101 workshops); anti-idling campaigns (e.g., Idle-Free Quiet Zone for truck drivers); and technical demonstrations promoting the adoption of existing and emerging new technologies.

The program is in its third year of operation and was implemented by the projected date. In fiscal year 2008/09, 170 fleets participated in 12 Fuel Management 101 workshops to promote greater uptake of transportation energy efficiency practices. The estimated GHG emissions reductions to date stemming from participation in SmartDriver and Fuel Management 101 workshops, as well as Idle-Free Campaigns, amount to 0.05 Mt (as per end of 2008/09, data yet to be finalized).

Analysis shows that, dependent on a number of factors, emission reductions attributed to the ecoENERGY for Fleets program could range from 0.5 to 0.7 Mt by 2012. The table below indicates the amounts that the Government anticipates the program will achieve.

Preliminary Expected Reductions (Mt)	2008	2009	2010	2011	2012
Low	0.22	0.34	0.47	0.50	0.50
High	0.31	0.48	0.66	0.70	0.70
Expected	0.22	0.34	0.47	0.50	0.50

ecoFREIGHT Program

The ecoFREIGHT program is investing $65 million over four years to reduce the environmental and health effects of freight transportation through the use of technology. The program includes six initiatives.

1. National Harmonization Initiative for the Trucking Industry: identifying regulatory barriers and solutions in collaboration with provinces and territories, so that the Canadian trucking industry can embrace emissions-reducing technologies.
2. Freight Technology Demonstration Fund: establishing cost-shared demonstrations to test and measure new and underused freight transportation technologies in real-world conditions, and disseminating information to industry.
3. Freight Technology Incentives Program: providing cost-shared funding to companies and non-profit organizations in freight transportation to help them to purchase and install proven emission-reducing technologies.

4. ecoFREIGHT Partnerships: building and maintaining partnerships within the transportation sector to reduce emissions from freight transportation through fast and flexible voluntary actions that can support the regulatory framework.
5. Please see the section on the Marine Shore Power Program.
6. Please see the section on ecoEnergy for Fleets.

With respect to the National Harmonization Initiative for the Trucking Industry (NHITI) two provinces, Ontario and Quebec, have now implemented heavy truck speed limiter regulations. The NHITI conducted significant foundational work to support this initiative, and is available to applicants to offer co-funding to assist with the development of enforcement capacity for these new requirements.

The Freight Technology Demonstration Fund and Freight Technology Incentives Programs have been launched. On March 7, 2008, 23 projects were selected for funding under Round 1. Twenty-six (26) projects have been selected for funding under Round 2, and the process of completing the contribution agreements is underway. Available funding under the program has been fully allocated.

The ecoFREIGHT Partnerships program is fully operational with the delivery of various shipper awareness and Memorandum of Understanding (MOU) activities with the Canadian air and rail associations. Annual reports were received by these two associations, reporting on progress achieved under the MOUs. Both associations were on track with their emissions reduction targets. The ecoFreight program was implemented by the projected date.

Analysis shows that, dependant on a number of factors, emission reductions attributed to the ecoFreight program could range from 1.508 to 1.372 Mt by 2012. The table below indicates the amounts that the Government anticipates the program will achieve.

Preliminary Expected Reductions (Mt)	2008	2009	2010	2011	2012
High	0	1.050	1.237	1.376	1.508
Expected	0	0.975	1.118	1.246	1.372

Marine Shore Power Program

The Marine Shore Power Program is investing $6 million over four years to demonstrate the use of shore-based power for marine vessels in Canadian ports to reduce air pollution from idling ship engines in some of Canada's largest urban centres.

A first round of funding was held on August 25, 2008. Under this first funding round, Vancouver Fraser Port Authorities was selected to build a marine shore power installation on the East and West berth at their Canada Place facility. The construction is underway and the marine shore power installation should be available for the 2009 cruise vessel season. A second round of funding will be held in 2009.

Following consultations with industry in Fall of 2007 it was decided to delay the program funding round until after amendments to the *Canadian Marine Act* come into force so as to ensure that Canadian Port Authorities were eligible for funding. Therefore the due date for applications for Round one funding was held on August 25, 2008. This program was implemented by the projected date and has been extended to 2012 to allow for full project completion.

Analysis shows that, dependant on a number of factors, emission reductions attributed to the Marine Shore Power program could range from 1.372 to 0.008 Mt by 2012. The table below indicates the amounts that the Government anticipates the program will achieve.

Preliminary Expected Reductions (Mt)	2008	2009	2010	2011	2012
Low	0	0.0032	0.0045	0.0045	0.0045
High	0	0.005	0.007	0.007	0.008
Expected*	0	0.005	0.007	0.007	0.008

*Preliminary estimates made when the program was developed in 2006.

Promoting Sustainable Urban Transit

The Public Transit Tax Credit allows individuals to claim a non-refundable tax credit for the cost of monthly public transit passes or those passes of a longer duration, effective July 1, 2006. The Credit was extended in Budget 2007 to electronic fare cards and weekly passes when used on an ongoing basis. The objectives for the measure outlined in Budget 2006 were to provide assistance to Canadians by making transit more affordable, to reduce traffic congestion in urban areas and to improve the environment by lowering greenhouse gas emissions. This tax credit applies in respect of the cost of eligible public transit passes for travel occurring after June 30, 2006. The expansion of the credit to the costs of electronic fare cards and weekly passes when used on an ongoing basis became effective starting January 1, 2007.

Analysis shows that, dependent on a number of factors, emission reductions attributed to the Public Transit Tax Credit could range from 0.037 to 0.039 Mt by 2012. The table below indicates the amounts that the Government anticipates the program will achieve.

Preliminary Expected Reductions (Mt)	2008	2009	2010	2011	2012
Low	0.032	0.033	0.034	0.036	0.037
High	0.032	0.033	0.035	0.037	0.039
Expected	0.032	0.033	0.035	0.036	0.038

Along with the public transit tax credit, the Government has introduced a number of initiatives that will promote the expansion and use of sustainable public transit in Canadian cities. While the initiatives described below may not achieve significant reductions during the Kyoto period, they should help promote the use of low-carbon transportation options that are necessary to combating climate change over the long term.

In November 2007, the Government launched the Building Canada Infrastructure plan that provided a record $33 billion for investments in public infrastructure. Public transit is one of five national priorities targeted under several components of the plan, including the $8.8 billion Building Canada Fund, the $2.275 billion Provincial-Territorial Base Funding, the $11.8 billion Gas Tax Fund extension and the $1.25 billion Public Private Partnerships Fund.

In Budget 2008, the Government committed a further $500 million for the Public Transit Capital Trust to support capital investments in transit across the country. This is on top of the $1.3 billion for public

transit capital investments in Budget 2006. Of these funds, $900 million was earmarked to provinces and territories through the Public Transit Capital Trust, a one-time investment paid through a third-party trust. The remaining $400 million was designed to accelerate provincial and territorial investments in public transit infrastructure.

The Government's commitment to support public transit continued in Canada's Economic Action Plan through the $4 billion Infrastructure Stimulus announced in Budget 2009, which will fund the same types of projects as the Building Canada Plan.

Provincial and Territorial Collaboration and Action

Provincial and territorial governments, which control many of the levers for taking action to reduce greenhouse gas emissions in key sectors, are pursuing many initiatives to achieve that goal. Combined with the activities of the Federal Government, over 1,200 climate change initiatives are underway across Canada. There is a wide diversity in the nature of initiatives, with a significant focus on mitigation. Other areas of focus include planning, management and regulations, adaptation, and education and awareness. Of actions focused on mitigation, the largest cluster of these is related to energy efficiency and conservation.

While there are some commonalities, approaches to climate change activities vary between provinces and territories. British Columbia and Quebec are pursuing carbon taxes; British Columbia announced the details of its tax on July 1, 2008. Alberta and Saskatchewan are pursuing regulatory frameworks. In 2007, Alberta passed the *Climate Change Emissions Management Amendment Act* to regulate greenhouse gas emissions from large industry. Together, Alberta and Saskatchewan are investing over $2 billion in carbon capture and storage technology. Ontario is phasing out the use of all coal-fired power plants, which will eliminate 30 megatonnes of carbon dioxide emissions per year.[6] British Columbia, Manitoba, Ontario and Quebec, along with several American states, are part of the Western Climate Initiative, which aims to create a carbon market.

Federal Collaborative Initiatives

This section on federal collaborative initiatives addresses the descriptive requirements of paragraph 5 (1) (a) (iv) of the Kyoto Protocol Implementation Act to include measures respecting cooperative measures or agreements with provinces, territories or other governments as well as paragraphs 5 (1) (b) (i) and (ii).

In Budget 2007, the federal Government put in place an important instrument for collaboration across jurisdictions on climate change policy. Under the $1.5 Billion Clean Air and Climate Change Trust fund, a trust has been established to support those provinces and territories that identify major projects that will result in real reductions in greenhouse gas emissions and air pollutants. For example:

- In part, using ecoTrust funds, British Columbia announced $98 million for the new LiveSmartBC: Efficiency Incentive Program and other initiatives to encourage individuals and communities to make more energy-efficient choices.
- The Alberta Government issued an Expression of Interest under the EcoAction Trust Fund in Fall 2008 and subsequently received 40 proposals totalling about $220M - 15 proposals are being seriously considered.
- The Ontario Government has identified that ecoTrust is financially contributing to a number of initiatives, including: the development and implementation of policies to monitor, analyze and address smog and air toxins; expansion of the GO Transit system; and the establishment of a bio-energy research centre associated with the Atikokan Generating Station.
- The Government of Quebec is using ecoTrust to, in part, fund its climate change action plan. Key activities within the action plan are encouraging the development of public transportation and energy efficiency measures.
- Nova Scotia has acknowledged the financial assistance of ecoTrust to fund their tidal energy demonstration project, and the wind integration study.

[6] The emission reduction impact of provincial actions such as Quebec's Carbon Levy, British Columbia's Carbon Tax and Alberta's Industrial Regulations are included for the purposes of reporting.

It is important to note that while the Government of Canada has provided the funding to provincial and territorial governments through the Trust, it is provincial and territorial governments themselves that are responsible for allocating the funds to specific programs. Since the federal Government does not determine precisely how these funds are used, there is an intrinsic uncertainty in calculating the number of emission reductions expected to result from the Trust Fund. In the coming year, the Government of Canada will work with its provincial and territorial partners to more effectively quantify reductions associated with the Trust Fund.

Clean Air and Climate Change Trust Fund					
Year	**2008**	**2009**	**2010**	**2011**	**2012**
Preliminary Expected Reductions (Mt)	16	16	16	16	16

Investing in Clean Energy Development

Enabling the development, demonstration and deployment of clean energy technologies, including carbon capture and storage (CCS), is an integral component of Canada's domestic and continental efforts to reduce greenhouse gas emissions.

Canada's Economic Action Plan commits $1 billion over five years to establish a Clean Energy Fund, which will enable clean energy research and demonstration projects, including carbon capture and storage (CCS). The funding provided in Canada's Economic Action Plan builds on previous investments in clean energy made through Budget 2008 to increase the development and deployment of CCS. The Government of Canada provided $240 million to the Province of Saskatchewan to partner with industry to implement a full-scale commercial demonstration of CCS in the coal-fired electricity sector. Along with this, Budget 2008 provided $5 million to the Institute for Sustainable Energy, Environment and Economy at the University of Calgary to work with a broad range of stakeholders on these outstanding issues, and $5 million to support geological research in Nova Scotia to examine the potential for carbon storage in that province.

It will be critical that the Government of Canada and the country's provincial and territorial governments continue to work together to make the progress on the clean energy production technologies necessary for Canada to meet its greenhouse gas emissions reduction goals. The Governments of Alberta and Saskatchewan in particular have taken great recent strides in investing in clean energy solutions, setting aside a collective total of more than $2.5 billion for such purposes.

It is expected that emission reductions from these initiatives will not be realized until after 2012.

Target for Clean Electricity Generation

To help meet the challenge posed by climate change, Canada will also need to make greater use of technologies that do not emit greenhouse gases. The Government will set an objective that 90% of Canada's electricity needs be provided by non-emitting sources such as hydro, nuclear, clean coal or wind power by 2020. Canada already has one of the cleanest electricity systems in the world, with 73% of the country's electricity currently coming from non-carbon emitting sources – the two most prevalent of which are hydro and nuclear power.

Canada's Emissions Levels from 2008 to 2012

In accordance with paragraph 5 (1) (c), the text and the table below set out Canada's projected greenhouse gas emission levels for 2008 to 2012 and how these levels compare with Canada's obligations under Article 3, paragraph 1, of the Kyoto Protocol. In addition to the levels in the table below, provincial plans and actions are expected to lower Canada's emission levels over the period of 2008 to 2012. However, it is premature to estimate the resulting emissions reductions in the context of this Plan. The projected emission levels will be verified by the national inventory reports, the first of which will be due on April 15, 2010, with the final report for 2012 due on April 15, 2014. The degree to which Canada has met its emissions reduction obligations under the Kyoto Protocol will be assessed after its final report has been filed in 2014.

Canada's allowable emissions under the Kyoto Protocol for the period 2008 to 2012 are 2,792 Mt.

The Government of Canada used Environment Canada's integrated Energy, Emissions and Economy Model for Canada (E3MC) to estimate the reduction for the overall integrated package of measures. The modeled runs incorporated the individual initiatives and aggregated the results to estimate Canada's net emission reductions from a continuing trends baseline to report the remaining emission levels for 2008-2012. This baseline already incorporates many measures and trends currently underway across Canada. Some of the measures included in the baseline are complimentary to federal policies presented in this report. The date of January 1, 2006 was used as a the cut-off point for defining existing measures that are to be included in the energy and emissions baseline projections. As such, to avoid double-counting, the impacts from these measures are not included in the total emissions reductions. The use of the model responds to the National Round Table's suggested methodological improvement for an "integrative accounting of the emission reduction estimates".

There are a number of key determinants that influence energy supply and demand, and emissions. These determinants include: the pace of economic growth; population and household formation; energy prices (e.g., world oil price and price of refined petroleum products, regional natural prices, and electricity prices); technological change and policy decisions. Varying any one of these assumptions could have a material impact on the energy and emissions outlook.

The sensitivity analysis focuses on two key drivers – world oil price and economic (or Gross Domestic Product) growth. Economic growth is correlated with growth in energy and emissions. Likewise, oil price changes affect the macro-economy, as well as exerting an influence on consumer behavior (e.g., a change in energy prices will encourage consumers to purchase more energy efficient products or reduce their overall energy consumption).

Emissions Levels – Reference Case

Under the **reference case, and excluding the measures presented in this Plan,** Canada's baseline emissions levels are expected to increase from 749 Mt in 2008 to 790 Mt in 2012. Under the reference case, the economy is projected to grow at 2.2% per year over the 2008 to 2012 period. Over the same period, the world oil prices are assumed to average about $75 per barrel (in US$2008).

With the measures presented in this Plan – including both federal measures and provincial/territorial measures – emissions levels are expected to be about 1 Mt below the baseline at 748 Mt in 2008 and about 74 Mt below the baseline at 716 Mt in 2012. Given the reductions anticipated from the measures in this Plan, Canada expects to be 802 Mt above its Kyoto Protocol target of 2,792 Mt during the 2008 to 2012 period.

Canada's Emission Levels					
Year	**2008**	**2009**	**2010**	**2011**	**2012**
Projected Emissions Excluding Government Measures (Mt)	749	739	743	766	790
Expected Emissions Including Government Measures (Mt)	748	737	691	702	716
Expected Emissions Reductions (Mt)[7]	1	2	52	64	74

Emissions Levels – Alternative Scenario

Given the uncertainty concerning the pace of economic growth and world oil prices, an alternative scenario has also been constructed. This scenario was selected as the most prudent, both in terms of forecasting baseline emissions growth, and in terms of estimating reductions anticipated from the measures in this Plan.

In this alternative scenario, the economy is projected to grow at 1.7% per year over the 2008 to 2012 period. Over the same period, the world oil prices are assumed to average about $98 per barrel (in US$2008). Under this **alternative scenario**, the combined effect of higher energy prices and lower economic growth results in a lower emissions forecast. Canada's baseline emissions levels, **excluding the measures presented in this Plan,** are expected to increase from 749 Mt in 2008 to 770 Mt in 2012, putting emissions in that year some 20 Mt lower than in the reference case scenario,.

With the measures included in this Plan, using the "low" expected reductions where available, emissions are expected to be about 1 Mt below the baseline at 748 Mt in 2008 and about 66 Mt below the baseline at 704 Mt in 2012. Canada's emissions would therefore be 757 Mt above its Kyoto Protocol target of 2,792 Mt during the 2008 to 2012 period.

Canada's Emission Levels Under the Alternative Scenario					
Year	**2008**	**2009**	**2010**	**2011**	**2012**
Projected Emissions Excluding Government Measures (Mt)	749	725	724	746	770
Expected Emissions Including Government Measures (Mt)	748	724	682	690	704
Expected Emissions Reductions (Mt)[8]	1	1	42	56	66

[7] The estimated emission reductions are based on the targets outlined in the 2008 Regulatory Framework as well as the program measures detailed above.
[8] Ibid

Conclusion

With this document, the Minister of the Environment has responded to the publication requirements of Section 5 of the *Kyoto Protocol Implementation Act*. The Government's domestic agenda for reducing the country's greenhouse gas emissions is a balanced approach that focuses on long-term results in cohesion with the continental and global cooperation required to minimize the harmful effects of climate change.

Provision of Comments

Pursuant to paragraph 5 (3) (a) of the *Kyoto Protocol Implementation Act*, persons are welcome to submit comments about the report to the Minister of the Environment, care of:

Director General, Strategic Policy Branch
Environment Canada
22nd Floor – 10 Wellington St.
Gatineau, Quebec
K1A 0H3

Comments must be provided in writing by June 28, 2009.

Annex 1

International Climate Negotiations

A key track in Canada's approach to combating climate change involves the country's active participation in international negotiations toward an agreement on a new global post-2012 climate change regime.

Throughout these ongoing negotiations Canada will play an active and constructive role, while protecting its core interests, including ensuring that Canada's economy is not unduly harmed in the development of a new post-2012 agreement. Canada will work closely with the United States, seeking to align the countries' positions where possible, to build a consensus among major economies on a pragmatic outcome at Copenhagen – one that achieves verifiable and lasting reductions in global greenhouse gas emissions.

Canada is committed to the negotiating track established in December 2007 at the 13th Congress of the Parties (COP) to the United Nations Framework Convention on Climate Change in Bali, which seeks a comprehensive agreement with commitments from all developed and developing countries. Under the Bali track, developed countries have agreed to consider making comparable efforts to reduce their greenhouse gas emissions, whereas developing countries have agreed to consider "nationally appropriate" actions to reduce emissions.

Following the most recent COP, in Poznan in December 2008, countries have entered into final negotiations which will continue to be ongoing throughout 2009 through to COP 15 in Copenhagen in December 2009. Canada's approach during these negotiations is founded on the goals and actions established in the country's domestic policies, all of which reflect the realities of the Canadian and North American economies. Canada will seek that major emitters make commitments to deviate significantly from their business-as-usual climate pathways while ensuring comparable action among countries.

Canada's negotiating mandate is based on five key principles:

- Balance environmental protection and economic prosperity: Canada will pursue sustained action to reduce greenhouse gas (GHG) emissions and strengthen adaptation to climate change, without unduly burdening any country's economic growth;
- Maintain a long-term focus: Canada will implement policies that put it on a pathway to achieving deep emissions reductions, with an ultimate global goal of a 50% reduction by 2050;
- Develop and deploy clean technologies: Canada will seek to stimulate innovation in low-carbon technologies by assuring the implementation of market-driven policies and strategic investments;
- Seek commitments from all major economies: All major emitters must assume commitments to reduce emissions and strengthen adaptation that are based on their responsibilities and capabilities; and
- Support constructive and ambitious global action: Canada will work with its North American partners and with all major economies to achieve a balanced and comprehensive outcome of the negotiations that will make real progress in combating climate change.

Major Economies Forum

Canada is participating actively and constructively in the Major Economies Forum. The Forum was launched in March 2009 by the United States to facilitate a candid dialogue among key developed and developing countries, help generate the political leadership necessary to achieve a successful outcome at the United Nations climate change negotiations in Copenhagen. The Forum will also seek to advance the exploration of concrete initiatives and joint ventures that increase the supply of clean energy while cutting greenhouse gas emissions.

Annex 2

Methodology for Estimating the Expected Greenhouse Gas Emissions Reductions

Introduction

This Annex describes the approaches taken to calculate estimated reductions from the measures detailed in the report. Two types of estimation procedures were used. Reduction estimates have been calculated on a case-by-case basis for the individual measures in the document as per paragraphs 5 (1) b (ii) of the Act. In addition, Environment Canada's integrated Energy, Emissions and Economy Model for Canada (E3MC) was used to estimate the emissions reduction for the overall integrated package of measures and the modeled results were used to report on Canada's emission reductions and total remaining emission levels for 2008-2012, thereby satisfying paragraph section 5(1)(c) of the Act.

The advice of the National Round Table on the Environment and the Economy is a key factor in the Governments' methods for estimating reductions. The *Response of the National Round Table on the Environment and the Economy to its Obligations Under the Kyoto Protocol Implementation Act* (September 2007) suggested certain methodological improvements for the development and presentation of reasonably expected emission reductions. These included the following:

- Transparency and clarity regarding assumptions and methodologies;
- Consistency in accounting for emission reductions over the relevant time period; and,
- Integrative accounting of results, where all programs are assessed in an integrated manner and the overall contribution accounts for positive and negative interactions between measures and regulations.

Estimates for Reductions from Individual Measures

This section describes the methodology used to generate emissions reductions from individual measures as well the resulting emissions levels for Canada in 2008-2012 that are required under paragraphs 5 (1) b (ii) of the Act.

Expected reductions from individual measures were estimated by the responsible department, with related parameters incorporated into E3MC. The methodologies for each individual measure are described below.

The Regulatory Framework for Industrial Greenhouse Gas Emissions

Industrial Greenhouse Gas Regulations

The March 2008 Regulatory Framework set an initial required reduction of 18% from 2006 emission intensity levels in 2010 for existing facilities. Every year thereafter, a 2% continuous improvement in emission intensity will be required. By 2015, therefore, an emission-intensity reduction of 26% from 2006 levels will be required, with a further reduction to 33% by 2020. New facilities, which are defined

as those whose first year of operation is 2004 or later, will be granted a three-year commissioning period before they will face an emission-intensity reduction target. After the third year, new facilities will be required to improve their emission intensity each year by 2%. A cleaner fuel standard will be applied, thereby setting the target as if they were using the designated fuel. New coal-fired electricity generation and oil sands facilities coming into operations in 2012 or later, will be required to achieve an emission intensity target which reflects the use of carbon capture and storage.

Environment Canada's E3MC model was used to estimate the emissions intensity reductions. Actual and estimated emissions for 2006 are available in the E3MC reference case for most of the covered industrial sectors.[9] GHG emissions are disaggregated in three broad categories: combustion-related, process and non-energy. For each of those categories, the share of what is fixed process emissions has been estimated. Those shares have been applied to the reference case GHG emissions in 2006 to produce a net figure for covered GHG emissions by covered sectors. The modeling of the targeted reductions under the Regulatory Framework for Industrial Greenhouse Gas Emissions was approached as follows:

- Establishing the baseline – The model was disaggregated to explicitly model each regulated sector. Economic growth and an emissions path were established for each regulated sector. In addition, the emissions pathway was adjusted to account for emissions which were deemed to be excluded under the framework (e.g., industrial fixed process emission and unintentional fugitives).

- Targeted Reductions – In order to calculate emissions intensity (emissions per unit of production), different measures of production were used. For the electricity sector, total electricity generated by fossil fuel was used. In the oil and gas sector, it was total production in the gas sector and oil sub-sectors. Gross Output was used for all the other covered sectors. Once the targeted intensities were defined, they were translated into targeted emission levels for each year. The targets were applied to each sector to estimate the required reductions to achieve the regulated reductions.

Reductions under the Regulatory Framework presented in this report represent the aggregation of reductions credited under all compliance options available to industry, in accordance with the targets contained in the Regulatory Framework released in 2008. Actual in-year reductions will vary from these amounts, depending on the specific compliance options chosen by individual firms. E3MC modeling indicates that choice of compliance option is in turn influenced by differences in marginal costs that they present to regulated industries. The expected emissions reductions totals also include reductions associated with complementary regulatory measures being taken by the Government of Alberta.

As noted in the main body of this report the Government has indicated that it is refining its regulatory approach to reflect the new realities of the global economic downturn and the opportunities represented by a new Administration in the United States. The Government has committed to releasing detailed plans by year's end. Changes in the overall regulatory framework are expected to result in changes to emissions reductions compared to those described in the 2008 Climate Change Plan for the purposes of the *Kyoto Protocol Implementation Act*. Given the KPIA deadlines for reporting, the 2009 Plan cannot reflect the new regulatory approach. Therefore, to comply with the Act this report includes the expected emissions reductions for the industrial regulations as described in *Turning the Corner,* though the final regulatory regime will differ from *Turning the Corner.*

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[9] Actual emissions are informed by several Statistics Canada surveys and reports, including the *Report on Energy Supply and Demand and the Industrial Consumption of Energy Survey* and Environment Canada's *National Inventory Report on Greenhouse Gas Emissions.*

Best Practices for the Capture of Unintentional Fugitive Emissions and HFCs

The Regulatory Framework mandates the application of best practices with respect to the control of unintentional fugitive emissions and HFCs.

- Fugitive emission reductions: In this analysis, it was assumed that emissions from unintentional fugitives, accounting for about 46% of total fugitives emissions, would decrease by 50% by 2020. This represents an average reduction of fugitives of about 3.5% per year starting in year 2010.

  HFC emission reductions: In the model, it was assumed that HFC emissions would decrease by 50% between 2010 and 2020.

Uncertainty Analysis

The reductions under the Best Practices for the Capture of Unintentional Fugitive Emissions and HFCs were estimated using the reference and alternative base case. This captures the manner in which the economic growth and world oil prices impact the industrial sector.

Regulating Energy Efficiency — Strengthening Energy Efficiency Standards

Methodology

For each product proposed for regulation, Natural Resources Canada calculates an initial estimate of the energy savings associated with introducing a minimum performance standard. The number is adjusted for the impact of labeling. The initial estimate is an aggregate of the estimated annual energy savings between sales of non-compliant and compliant products. These savings are based on estimates of the current level of efficiency of the most popular product model not complying with a proposed minimum performance level, and sales/shipments of products that would not comply with the prospective standard. Initial estimates are refined through the regulatory process and details are published in a Regulatory Impact Analysis Statement. Energy savings (by fuel) were converted to greenhouse gas reductions using standardized conversion factors.

Uncertainty Analysis

Preliminary expected reductions are provided as reflected in the Regulatory Impact Analysis Statement (December 24, 2008). They have been adjusted from past years to account for changes to regulatory timing (e.g., the inclusion of general service lighting under Amendment 10 resulted in a longer consultation period; the negotiated interim reduction in stringency for incandescent reflector lamps).

It should be recognized that though the estimated reduction profile (by year) has changed in response to regulatory and market conditions, the long-term greenhouse gas impacts of energy efficiency regulations are expected to be greater than previously estimated. The decline in expected reductions in the early years of the regulatory framework should be considered deferred rather than lost.

Regulating Renewable Fuels Content

Methodology

The volumes of gasoline and diesel used to determine the volume of renewable fuel subjected to the 5% for ethanol and 2% for diesel and heating oil requirements were taken from projections provided in

Natural Resource Canada's Energy Outlook. The regulated requirements of 5% for ethanol and 2% for diesel and heating oil were applied to these projected volumes to determine the volume of ethanol and biodiesel needed. The volumes of ethanol required from 2010 to 2012 are based on a growth rate of 2% per year. It was assumed that the 5% requirement would be met through the use of ethanol only and the 2% requirement would be met through the use of biodiesel only.

The greenhouse gas emission reductions are based on emission factors provided from Natural Resource Canada's GHGenius model. The factors used were:

1.25 Mt GHG reduction / billion litres of ethanol

2.2 Mt GHG reduction / billion litres of biodiesel

Emission factors contained within the model were applied to the estimated renewable fuel volumes to determine the resulting emission reductions.

Data sources used include NRCan's *Canada's Energy Outlook: The Reference Case 2006, Statistics Canada Catalogue no. 45-004-XIE The Supply and Disposition of Refined Petroleum Products in Canada (April 2007)* for 2006 volumes and emission factors based on NRCan's GHGenius.

Uncertainty Analysis

A range of greenhouse gas emission reductions was estimated based on either including or excluding the effect of provincial regulations on the incremental volume of renewable fuel volume required by the federal renewable fuels regulation. The high estimate is the expected greenhouse gas reduction based on the total volume of renewable fuels that would be required by the federal regulations. The low estimate is the expected greenhouse gas emission reductions based on the total volume of renewable fuels that would be required by the federal regulations, minus the volume of renewable fuels from finalized provincial regulations (as of April, 2009: ethanol: British Columbia, Saskatchewan, Ontario and Manitoba; biodiesel: British Columbia).

The reduction estimate for 2010 reflects a September start date for the federal regulation. Ethanol and biodiesel volumes in the market prior to 2010 are not accounted for. For 2011 and 2012, respectively, the low estimate shows a 0.2 megatonne per year greater benefit, than the estimate provided for the original KPIA report. In the new estimate, proposed renewable mandates in Alberta and Manitoba are no longer counted against the total renewable volume of the federal regulation, as they have not yet been finalized as of this writing.

The emission factors contained within the model were applied to the estimated renewable fuel volumes to determine the resulting emission reductions. The emissions factors used for the anticipated GHG emissions reductions of the regulations reflect factors such as lower emissions from dominant cultivation practices for biofuels feedstocks such as corn, wheat, canola and soy. The Government has also indicated that its calculations use more recent data for biofuels processing than many other studies, thus reflecting recent improvements in efficiency.

New fuel demand growth and emission factors are currently being developed that will be used in the renewable fuels regulations regulatory impact assessment and subsequent updates. This will provide greater certainty on actual future performance in GHG emission reductions through increased use of biofuels.

ecoENERGY for Renewable Power

Methodology

Greenhouse gas emission reductions were estimated based on the expected total capacity, their associated expected clean energy production, and an emission factor of displaced fuel.

Uncertainty Analysis
The GHG emission factor used for the estimates of GHG reduction calculation is 465.88t/GWh. The GHG factor was developed based on the provincially-weighted average of marginal fuel sources across the country. The value of emission factor used directly influences estimate of GHG reductions. Any uncertainties in the emissions factor, therefore, have a direct impact on the uncertainty of the emissions estimate.

The program is designed to encourage 14.3 terawatt-hours of electricity production per year by 2012-2013 (translates to about 4000 megawatts of renewable power capacity). The terawatt-hour target is directly related to the program's transfer payment budget of $1.43 billion through a production incentive equivalent to 1 cent per kilowatt hour. Consequently, the calculations of GHG emissions are related to the amount of electricity produced on a yearly basis, i.e. GWh or TWh, and the transfer payments made to recipients.

The amount of electricity produced is dependent on two key factors:

1) The amount of megawatts from each of the renewable sources (wind, hydro, biomass, solar PV etc.) and when these megawatts come on line or are commissioned, and
2) The expected capacity factor for each technology.

The uncertainties surrounding these factors and how they were mitigated at the program development stage are described below:

1) For each year (2007 to 2011), the program estimated certain megawatts of capacity per technology coming on line or commissioned. About 4000 MW of projects were expected to be commissioned by March 31, 2011, which is the end of the implementation period for program. The expectations surrounding the type and timing of projects coming on line were based on industry consultations and technical expertise.
2) Most renewable energy sources are intermittent and each renewable technology has a different capacity factor. During program design, the capacity factors used for each technology type were based on consultations with industry, recommendations of the Commissioner of the Environment and Sustainable Development, and experience from the Wind Power Production Incentive program. As a result each technology has a maximum limit on the capacity factor.

ecoENERGY for Renewable Heat

Methodology
Greenhouse gas emission reductions were estimated based on the number of expected projects, expected energy savings, and an emission factor of displaced fuel.

Uncertainty Analysis
The uncertainties surrounding these factors and how they were mitigated at the program development stage are described below.

1) Estimate for the expected number of projects to be supported by the program was based upon experience with the Renewable Energy Deployment Program Initiative (REDI) program, knowledge of solar thermal industry and the level of program funding. The expected GHG reductions were based upon assumptions that the program would support deployment of 700 units of solar thermal systems (air and water heating) in institutional, commercial and industrial (ICI) sectors, and complete eight residential pilot projects.
2) Expected energy savings resulting from the supported projects were based upon the modeled results of completed projects under the REDI projects. For residential pilot projects, the energy savings per house were based upon solar energy solar yield of residential products.
3) Emissions factors for displaced fuels: the relative proportion of displaced fuels for project supported by the program were based upon the projects completed under the REDI program,

and on the energy use split for hot water in Canada's commercial and residential sector as per Energy Use Data Handbook published in June 2005. The value of the emission factors used for fuels has a large degree of influence on estimates of GHG reductions.

ecoENERGY for Buildings and Houses

Methodology

This program has several elements whose impacts were calculated individually. Technical and past program files provided the information for average savings growth and participation for each element.

- Buildings Component:
  - **New Buildings** - For code improvement, the impact was based on two factors: an assessment of the improvement to be gained from an upgraded and provincially adopted (in 2010/2011) Model National Energy Code for Buildings and a forecast of new commercial floor space. In addition, a service offered to validate building designs is expected to increase overall efficiency and energy savings compared to normal construction processes. Energy savings are estimated by using the expected number of building designs validated over the four-year period, the average floor space of these buildings and the average expected energy savings per unit of floor space.
  - **Existing Buildings** - Real property managers are provided with information about energy use in their buildings, resulting in improved energy use. Studies of the impact of other information and training measures were used to determine the expected percentage of improvement in energy savings. This percentage was then applied to the number of buildings NRCan expects to reach using the program.

- Houses Component:
  - **New Housing** - The expected energy savings per house was calculated by comparing the average energy consumption of National Building Code-compliant new houses with the energy consumption of houses rated under the R-2000 and EnerGuide labelling categories for energy-efficient homes. To obtain total energy savings, the savings per house is multiplied by the number of houses expected to be built and labelled. The impact of training on general construction practices is also calculated, based on program data, market trends, follow-up with participants and forecasted housing starts.
  - **Existing Housing** - Overall energy savings were calculated by taking the average energy savings resulting from actions taken as a result of energy evaluations and the expected improvements per evaluated home and multiplying these savings by the number of homes expected to be evaluated each year.

Uncertainty Analysis

The stated reduction expectations are based on historical levels of code-compliance. The impact of free-ridership is expected to be minimal in terms of the major program components (i.e., the building code updates).

Preliminary expected reductions are provided as a range to reflect the inherent risks involved in program implementation. Expected reductions represent conservative estimates of program impacts.

ecoENERGY Retrofit Initiative

Methodology

Estimated reductions from this program were estimated using information from technical and past program files, specifically, the average savings and participation rates for each sub-component of the initiative, subject to the limitations of the program design.

Homes Component: The estimate of emissions saved was based on the expected energy savings per house multiplied by the number of houses expected to participate in the program. Energy savings were based on NRCan's program experience in this area, while the number of houses was estimated using a combination of past program participation and current funding levels.

Small and Medium Organizations – Buildings and Industry: The impact estimates represent the expected average energy savings per project multiplied by the expected number of projects, based on experience with past program participation and subject to current funding levels.

Uncertainty Analysis

Uncertainty concerning the emissions reductions estimates associated with the ecoEnergy Retrofit initiative is consistent with the following specified variables. Free-ridership was initially expected to have minimal influence on expected GHG reductions. This is due to incentive eligibility being designed to minimize this practice (e.g., requiring a minimum 1 year project payback period for those Small and Medium Organization projects receiving funding; requiring a pre-project energy assessment or audit; not incenting projects that begin prior to official approval being received from NRCan). The significance of free-ridership will be assessed as part of an NRCan study in 2009.

Preliminary expected reductions are provided as a range to reflect the inherent uncertainty and risks involved in program delivery. Expected reductions represent a conservative estimate of program impacts.

The methodology employed to calculate the expected ranges presented above varies between the three components of the ecoENERGY Retrofit Initiative. For ecoENERGY Retrofit – Homes, the range is based on different calculated GHG reductions per house, specifically Low: 3.0 t/house, High: 3.5 t/house and Expected: 3.2 t/house (methodology accounts for budget increase). For ecoENERGY Retrofit – SMO and the Existing Buildings Initiative, 10% is subtracted from the calculated program reductions to account for implementation risks.

ecoENERGY for Industry

Methodology

Technical studies and past program files provided average savings and participation for both elements of the program. Energy savings (by fuel) were converted to greenhouse gas reductions using standardized conversion factors.

Estimated reductions were calculated by multiplying the average energy savings per participating facility (based on technical studies and past program files) by the expected number of participants for the informational and the instructional elements of the program.

These calculations for estimating avoided emissions were done separately for the two program components: (1) energy savings from the Canadian Industry Program for Energy Conservation (CIPEC) and (2) energy savings from site-specific energy assessments.

Uncertainty Analysis

Preliminary expected reductions are provided as a range to reflect two possible scenarios regarding the types of industrial firms which participate in both the CIPEC program and the site assessments. High-end expected reductions are based on the assumption that large final emitters (LFEs) participate in both sub-initiatives, while the low-end expected reductions assume LFEs are not involved in either. The expected reductions in the Preliminary Expected Reductions table represent conservative estimates of program impacts.

ecoAUTO Rebate

Methodology

To calculate the anticipated greenhouse gas emissions reduction from the ecoAUTO rebate program, Transport Canada used the North American Feebate Analysis Model. Like Environment Canada's Energy-Economy-Environment Model for Canada, the model used by Transport Canada approximates consumer's and manufacturer's decisions using Qualitative Choice Theory. These decisions are based on the price of buying and operating a vehicle compared with the perceived trade-off between energy savings through improved efficiency and the incremental capital and operating costs. In order to determine the impact of the policies on greenhouse gas emissions, Transport Canada's model incorporates a simplified version of Natural Resources Canada's Champagne model, a light-duty vehicle stock-accounting framework.

In the North American Feebate Analysis Model, the impact of the policy is estimated against a "base case" scenario where the model is run without any policy intervention. With everything else being held constant, all the changes in the values observed are associated with the policy. The model will compare the characteristics of a vehicle, its use, and actual sales number, with or without the policy. This in essence is how the analysis takes into account the free-rider issue. The estimate of annual greenhouse gas emissions savings due to the ecoAUTO rebate program is calculated by using the difference between the annual emissions estimate calculated for the base case and the annual estimate calculated for the policy scenario. The resulting savings are incremental, annual emission reductions attributed to the ecoAUTO rebate program.

The model used for this analysis was calibrated to the most up-to-date database available reflecting the characteristics of 2003 model-year vehicles available for sale in the North American market (Canada and United States). These vehicles are then "modified" with new fuel efficient technologies through time, using assumptions about consumer preferences, fuel price, technology cost, fuel consumption improvements, and industry production plans reflecting decision-making in a North American market.

Manufacturers' response is estimated by estimating how 2003 model-year vehicles evolve through time, given assumptions about how often vehicles are modified, and what are the costs associated with increasing a vehicle's fuel efficiency. Given the fact that the ecoAUTO program was announced in Budget 2007 and was only in effect for less than two years, the assumption has been that the program has not prompted manufacturers to modify their vehicles in any significant way given the short lead time and the 2 year length of the program. Although there is anecdotal evidence that some manufacturers did make some marginal modifications to their vehicles during the course of the program to qualify for the rebate, the assumption, in all cases considered is that the program had no impact on manufacturers' decisions about the vehicles they made available to consumers over the last two model years.

Uncertainty Analysis

The analysis of the impact of the ecoAUTO rebate program is sensitive to assumptions regarding vehicle operating cost and market (consumers and manufacturers) behaviour. New analysis was conducted this year to estimate the potential impact of variations to those assumptions on the greenhouse gas reduction estimates. Following is a description of the assumptions made by Transport Canada for the "Expected" and "High" cases. The expected and high cases represent sensitivities to the most recent development in fuel prices and the impact of changes in operating costs on vehicle use (the rebound effect).

In Transport Canada's model, consumer behaviour is represented by assumptions about consumers' price elasticity of demand, their valuation of potential fuel savings, and the rebound effect.

Changes in fuel costs have a direct impact on the potential fuel savings achieved when reducing a vehicle's fuel consumption – for a similar change in fuel consumption, a higher fuel price will lead to

higher savings. The $0.80 per litre fuel price represents the Canadian average motor gasoline prices for the 12-month period ending in November 2004, which was the time period when the 2003 model-year vehicles were manufactured and sold. The fuel price of $1.10 per litre represents the average gasoline prices observed in Canada from March 2007 (introduction of the ecoAUTO program) to December 2008.

The combination of the high price without allowing manufacturers to implement incremental technology improvements defines the expected impact case as it is expected that the policy will have less incremental effect on consumers in this situation.

In addition, for both cases, the analysis now assumes that the rebound effect of better fuel efficiency is 15%, rather than the 23% that was used in the preliminary estimates done when the program was developed in 2006. This change stems from recent studies suggesting that the rebound effect is lower than previously thought. In addition, in making it fuel economy ruling for model-year 2011, the National Highway Traffic Safety Administration in the United States has also chosen to use a 15% rebound effect as its expected value.

	***Expected* Case**	***High* Case**
Fuel Prices (¢ per litre)	110	80
Rebound effect	-0.15	-0.15

Green Levy

Methodology

To calculate anticipated greenhouse gas emissions reductions from the Green Levy, Transport Canada used the North American Feebate Analysis Model. Like Environment Canada's Energy-Economy-Environment Model for Canada, the model used by Transport Canada approximates consumer's and manufacturer's decisions using Qualitative Choice Theory. These decisions are based on the price of buying and operating a vehicle compared with the perceived trade-off between energy savings through improved efficiency and the incremental capital and operating costs. In order to determine the impact of the policies on greenhouse gas emissions, Transport Canada's model incorporates a simplified version of Natural Resources Canada's Champagne model, a light-duty vehicle stock-accounting framework.

In the North American Feebate Analysis Model, the impact of the policy is estimated against a "base case" scenario where the model is run without any policy intervention. With everything else being held constant, all the changes in the values observed are associated with the policy. The model will compare the characteristics of a vehicle, its use, and actual sales number, with or without the policy. This in essence is how the analysis takes into account the free-rider issue. The estimate of annual greenhouse gas emissions savings due to the Green Levy is calculated by using the difference between the annual emissions estimate calculated for the base case and the annual estimate calculated for the policy scenario. The resulting savings are incremental, annual emission reductions attributed to the Green Levy.

The model used for this analysis was calibrated to the most up-to-date data available reflecting the characteristics of 2003 model-year vehicles available for sale in the North American market (Canada and United States). These vehicles are then "modified" with new fuel efficient technologies through time, using assumptions about consumer preferences, fuel price, technology cost, fuel consumption improvements, and industry production plans reflecting decision-making in a North American market.

Uncertainty Analysis

The analysis of the impact of the Green Levy program is sensitive to assumptions regarding vehicle operating cost and market (consumers and manufacturers) behaviour. New analysis was conducted this year to estimate the potential impact of variations to those assumptions on the greenhouse gas reduction estimates. Following is a description of the assumptions made by Transport Canada for the Expected and High cases. The expected and high cases represent sensitivities to the most recent development in fuel prices and the impact of changes in operating costs on vehicle use (the rebound effect).

In Transport Canada's model, manufacturers' technology response is estimated by simulating how 2003 model-year vehicles are modified through time, given assumptions about how often vehicles are retrofitted (generally over a four to five years schedule), and what are the costs associated with increasing a vehicle's fuel efficiency. The sensitivity analysis of the Green Levy now includes a technology response of the policy for the high case. Inclusion of the technology effect in the analysis has the consequence of progressively increasing the impact of the program, as more retrofitted vehicles enter the fleet.

Consumer behaviour is represented by assumptions about consumers' elasticity of demand, their valuation of potential fuel savings, and the rebound effect.

Changes in fuel costs have a direct impact on the potential fuel savings achieved when reducing a vehicle's fuel consumption – for a similar change in fuel consumption, a higher fuel price will lead to higher savings. The $0.80 per litre price represents the Canadian average motor gasoline prices for the 12-month period ending in November 2004, which was the time period when the 2003 model-year vehicles were manufactured and sold. The fuel price of $1.10 per litre represents the average gasoline prices observed in Canada from March 2007 (introduction of the Green Levy) to December 2008.

The combination of the high price while allowing manufacturers to implement incremental technology improvements defines the high case as it is expected that the policy will have more incremental effect on consumers in this situation. The assumptions made in the high scenario lead to the greatest impacts by 2012 due to technology adoption. The expected scenario assumptions yield a greater initial impact in 2008 due to lower fuel prices, but do not yield as much impact over the longer term.

In addition, for the high case, the analysis now assumes that the rebound effect of better fuel efficiency is 15%, rather than the 23% that was used for the preliminary estimates that were provided in 2006. This change stems from recent studies suggesting that the rebound effect is lower than previously thought. In addition, in making it fuel economy ruling for model-year 2011, the National Highway Traffic Safety Administration in the United States has also chosen to use a 15% rebound effect as its expected value.

	***Expected* Case**	***High* Case**
Fuel Prices (¢ per litre)	80	110
Rebound effect	-0.23	-0.15

ecoENERGY for Personal Vehicles Initiative

Methodology

The program interventions include a number of elements whose impacts were calculated individually. The estimated energy savings of program interventions were calculated based on the expected number of drivers reached by the program, the changes in their behaviour resulting from the program, and the fuel saved because of these changes.

Government publications, accepted models, technical studies and past program files provided information regarding these variables and the basis for the estimates of participation, rates of adoption and retention of fuel-efficient practices, and the average impact of these practices.

Uncertainty Analysis
The Government of Canada has a number of programs designed to reduce GHG emissions from the transportation sector. These programs are designed to be complementary. Preliminary expected reductions represent conservative estimates of program impacts.

ecoMOBILITY Initiative

Methodology
Transportation Demand Management (TDM) is the application of strategies and policies to reduce automobile travel demand, or to redistribute this demand to other modes. The program will achieve its GHG impact by funding TDM initiatives that reduce the distance (VKT) traveled by passenger vehicles in urban areas. It can be a cost-effective alternative to increasing road infrastructure capacity, and can help maximize the benefits of existing infrastructure. It is important to note that the effect of the ecoMOBILITY program is linked with the availability of alternatives to personal vehicles. Certain transit-based TDM strategies must be implemented in close collaboration with transit investments, while other strategies such as teleworking and other workplace programs can be implemented more independently. Canada's Economic Action Plan, including the $4 billion Intrastructure Stimulus announced in Budget 2009, will support accelerated investments in public transit infrastructure that should contribute to greenhouse reductions over the longer term. The ecoMOBLITY program will focus its activities on non-transit based TDM strategies that can be delivered in parallel to accelerated infrastructure projects rather than seek to introduce complexity or delays in these major projects through the demonstration and impacts reporting of incremental transit-based TDM strategies.

In 2006, it was assumed that the program could support a reduction in total VKT in urban areas by 3% in 2010 through the direct and indirect (transformative) effects of the program activities. This assumption came from the "high TDM" option outlined in a study commissioned by Transport Canada ("The Impact of Transit Improvements on GHG Emissions: A National Perspective", Transport Canada, March 2005). This option assumed that both transit and non-transit TDM measures would be implemented by municipalities in combination with significant transit infrastructure investments. The 3% reduction was applied to historical VKT data available from NRCan, the results were translated into reductions in fuel use and subsequently GHG reductions using EC conversion factors. This methodology yielded a preliminary estimate of 1.6Mt in 2012. The current program approach to focus on a narrower range of non-transit based TDM strategies will necessarily lower GHG emission reductions that will be attributable to the program in 2012.

Uncertainty Analysis
Sensitivity analysis was conducted on the assumptions made about VKT reductions. An expected scenario assumes a 0.2% reduction of VKT in 2012 yielding an estimated 0.112Mt reduction. A higher scenario assumes a VKT reduction of 0.4% yielding an estimated 0.223 Mt inn 2012. Because the selection of projects under the program was initially delayed to allow for more national consultations in 2007, it is also unlikely that the project implementation will be sufficiently advanced to yield GHG reduction in 2009.

National Vehicle Scrappage Program

Methodology
Projected GHG reductions are small as the focus of the program is on reducing smog-forming emissions, not greenhouse gas emissions. Expected GHG emissions reductions are the result of individuals retiring their old vehicle and choosing sustainable forms of transportation such as public transit or membership in a car-sharing program.

GHG reductions are the difference between emissions from the older, retired vehicle and its replacement (assumed to be the reward chosen by program participant). Estimates published here are based on anticipated program uptake and incentive selection. However actual reductions will be estimated individually for each participant through a database developed specifically to manage the program and track results. Published data for emission factors, annual vehicle usage, and transit data are the basis for the calculations.

Uncertainty Analysis
Emissions estimates will vary with number of program participants, reward selection, and personal transportation behaviour after the older vehicle has been retired.

ecoTECHNOLOGY for Vehicles Program

Methodology
Direct and transformative GHG savings for the ecoTECHNOLOGY for Vehicles Program (ETVP) were based on estimates calculated from the previous pilot Advanced Technology Vehicle Program, which followed a similar program model on a smaller scale. Direct savings refers to reductions from incremental advanced technologies that are embedded in conventional vehicles in the Canadian market. Transformative savings refers to reductions from non-conventional advanced vehicles (e.g. hybrids, electric, etc.)

For direct GHG savings it was assumed that 20% of sales of new vehicles with less than 6 l/100 kms fuel efficiency would be influenced by public outreach and education activities of ETVP.

Transformative emissions savings estimates were based on the forecast market shares of advanced technology vehicles over the relevant period. Advanced technology vehicles were defined as vehicles presenting an 11.5% improvement. In comparison, the average improvement of new vehicles was estimated at 7.5%. It was assumed that 20% of these advanced technology vehicle sales were attributable to the ETVP.

In both cases, vehicles were assumed to save 2L/100kms and travel 23,500 kms per year.

Uncertainty Analysis
Preliminary estimates were based on assumptions made about new vehicle sales, technology penetration and vehicle distance travelled forecasts. The economic downturn has impacted significantly on vehicle sales. In addition, fuel prices are also lower that expected making advanced technologies less attractive due to longer payback period. These factors will contribute to a lower market penetration of advanced technologies and reduce the overall impact of the program within the program timelines. Initial reductions estimates are expected to be achieved 2 to 3 years after the end of the program.

The low scenario assumes lower market penetration of advanced technologies, lower fuel saving applied to lower sales figures.

ecoENERGY for Fleets

Methodology
This program contains a number of elements whose impacts were calculated individually. The estimated energy savings were calculated based on the expected number of transportation professionals reached by the program, the changes in their behaviour resulting from the program, and the fuel saved because of these changes.

Government publications, accepted models, technical studies and past program files provided variables and the basis for the estimates of participation, rates of adoption of fuel-efficient practices, and the average impact of these practices.

Uncertainty Analysis
The Government of Canada has a number of programs designed to reduce GHG emissions from the transportation sector. These programs are designed to be complementary and there is some overlap in terms of the target audience. As such, this provides a small degree of uncertainty in this analysis.

Preliminary expected reductions are provided as a range to reflect the inherent risks involved in program implementation. Expected reductions represent conservative estimates of program impacts.

ecoFREIGHT

Methodology
The GHG preliminary estimates are based on the data supplied by the project proponents in historical or previous program proposals, Contribution Agreements, progress and final reports.

The historical data was adapted to form the preliminary impact estimates for the current ecoFREIGHT programs by pro-rating the direct GHG impacts on the basis of the magnitude of the funding allocated to the new programs.

The ecoFreight direct impact was calculated from the forecasted number of projects and their GHG impacts. The ecoFreight indirect (i.e: transformative) impact was calculated by applying a factor of approximately 2 (2008: 1.75 to 2012: 2.4) to the direct impact of a particular year. The factors were obtained from the indirect calculation assumptions based on the simple payback period of the technologies. If the direct impact was estimated at 100 Kt in 2012, the indirect impact was estimated at 240 kt for a total impact of 340 kt in 2012. Where appropriate, reduction associated with the Memoranda of Understanding and with speed limiters activities were added to the estimates.

Uncertainty Analysis
The scenarios were developed by updating the preliminary estimates for direct impacts with information drawn from the actual projects now receiving funding under the program, rather than information from historical projects. The current technology projects will be completed progressively by 2010/11 under the program. A 0.4 Mt annual reduction was included in the reductions from the activities of the NHTSI, reflecting estimated impacts of the truck speed limiter regulations in Ontario and Quebec. (Note that there is no consensus among jurisdictions at this time to proceed with a national mandate on such regulations.)

The uptake of technology may differ due to increases in the costs of equipment and/or the ability/willingness of promoters to invest in such project during the economic downturn.

In addition, fuel prices are also lower that expected making energy-saving technologies less attractive due to longer payback period. These factors may reduce the overall market penetration

of energy-reducing technologies and reduce the overall impact of the program. The key uncertainty addressed in the scenarios is linked with the transformative or indirect impacts.

The expected scenario is based only on the expected direct reductions of projects selected under ecoFREIGHT program funding Rounds 1 and 2, which are expected to contribute an estimated 57.3 kilotonnes of GHG emission reductions in 2012 to the impact of ecoFREIGHT. It is also based on the introduction of speed limiters in 2 provinces. No replication, or indirect effect, is assumed by 2012.

In the high scenario, indirect reductions are assumed to occur through replication of program projects in the freight industry. The ecoFREIGHT indirect (ie: transformative) impact was calculated by applying a factor of approximately 2 (2009: 1.75 to 2012: 2.4) to the revised direct impact of a particular year as described in the methodology section.

Both scenarios also include targeted reductions (from 0.5 Mt in 2009 to 0.9 Mt in 2012) under the voluntary agreements.

The Marine Shore Power Program

Methodology
The information used to calculate GHG emission reduction for the Marine Shore Power Program comes from Transport Canada's *Feasibility Study to Determine Suitable Locations for Marine Shore Power Pilot Projects in Canada* (Final Report, July 2005). In this study, 15 sites were analyzed for which GHG estimates were calculated.

The approach averaged out the GHG savings of 11 of the 15 projects analyzed (excluding 4 projects considered to be too expensive to implement). The average net annual GHG savings used was 1.3 kt per project

It was assumed that the funding received would allow for 4 projects to be implemented under the MSDP, each achieving an average net annual GHG reduction of 1.3 kt for a total of 5.3 kt in 2010. (Note that in reality it could be a mix of larger and smaller projects together.)

For the "transformative" impact of the program, we assumed that 2 more projects would be implemented after 2010 (1 in 2010 and 1 in 2012) as a result of the demonstrations, each also achieving a net annual GHG reduction of 1.3 kt for a total of 2.6 kt per year in 2012.

Uncertainty Analysis
Preliminary estimates assumed the implementation of a total of 6 projects of varying sizes. The number and/or size of projects may differ due to increases in the costs of equipment and/or the ability/willingness of promoters to invest in such project due to the economic downturn.

The low scenario has been estimated to reflect a scenario where only one additional project is selected and implemented under the program (for a total of 2 projects), with an expected annual reduction of 4.5 kt (ie 1.3 kt added to the current project estimate of 3.2 kt).

The high scenario has been estimated on the assumption that 2 additional projects are funded under the Program (for a total of three) and two others are implemented as an indirect result of the demonstrations.

Promoting Sustainable Urban Transit

Methodology
The estimated emissions reductions for the 2009 Plan use the same methodology as the one used to calculate the estimated emissions reductions for the 2008 Plan.

The calculation used information on public transit trips (ridership) and greenhouse gas emissions factors from the Climate Change Transportation Table. A constant 2.65% annual growth (avg. of the last five years) in ridership was used to project baseline levels of ridership over the 2008-2012 period. Based on a calculation that the tax credit would result in an effective fare reduction of 9.0%, and using a short-term own-price elasticity for the overall market of 2.5%, which is based on a study by Litman

for the Victoria Transport Policy Institute, new (incremental) trips resulting from the tax credit were calculated. These new trips were adjusted to estimate reduced vehicle trips based on information on vehicle occupancy from Transport Canada, and appropriate emissions factors were applied to these figures to produce the emission reduction estimates for each year.

Uncertainty Analysis

There are many factors at play which makes it virtually impossible to assign greenhouse gas emissions reductions to this measure with any certitude. Vehicle operating cost increases (fuel price, parking costs, etc.), and transit supply or service improvements are just two factors that can influence ridership. Moreover, improvements to vehicle fuel economy and the increased penetration of lower-emitting fuels, would work to lower the overall emissions reduction potential. Therefore, the estimated reductions are likely representative of the upper bound of potential reductions for this measure.

Canada's Greenhouse Gas Emissions Levels for 2008-2012

The Government of Canada is applying Environment Canada's integrated Energy, Emissions and Economy Model for Canada (E3MC) to estimate the reduction for the overall integrated package of measures. The modeled runs incorporated individual parameters for each of the initiatives reported here, as provided by lead departments, and aggregated the results to report on Canada's net emission reductions and total remaining emission levels for 2008-2012. The use of the model responds to the National Round Table's suggested methodological improvement for an "integrative accounting of the emission reduction estimates".

The E3MC model incorporates an updated energy, emissions and economy baseline that includes the latest greenhouse gas emissions inventory published by Environment Canada. This baseline already incorporates many measures and trends currently underway across Canada. The date of January 1, 2006 has been applied as the cut-off point for defining existing measures that are to be included in the baseline. Some of these measures included in the baseline are complimentary to federal policies presented in this report. As such, to avoid double-counting, the impacts from these measures are not included in the total emissions reductions. Some key assumptions in the baseline that effect federal policies in the 2009 Kyoto Protocol Implementation Act Plan include:

- The closure of all coal-fired electricity generation plants in Ontario by 2014;
- The adoption of the Renewable Portfolio Standard by all provinces; and
- The implementation of provincial mandates for mandatory content of ethanol in gasoline.

To capture the effects of the Government's climate change programs, the assumptions used for the individual measures were built into the closely replicated E3MC model. In the model, consumers of energy respond to the program parameters by making decisions regarding investments using Qualitative Choice Theory.[10] These decisions are based on the price of fuel combined with the perceived trade-off between energy savings through improved efficiency and capital and operating costs. For example, a program such as the ecoENERGY Retrofit Initiative provides financial support to reduce the cost of implementing an energy efficiency project, encouraging investment by improving the trade-off between efficiency and investment costs.

[10] Qualitative Choice Theory is based on the work of the Nobel Laureate, Daniel McFadden. Using Dr. McFadden's theory, several other leading economists such as Kenneth Train have applied this theory to estimating demand in key energy using sectors of the economy such as transportation and the built environment.

The 2008-2012 emission levels for Canada were generated by combining the individual emissions reductions measures in E3MC. This ensured that measures were assessed in an integrated manner, thereby accounting for positive and negative interactions between measures and regulations.

Uncertainty Analysis

An alternative scenario has been constructed as a component of Environment Canada's sensitivity analysis. In this alternative scenario, the economy is projected to grow at 1.7% per year over the 2008 to 2012 period (as opposed to 2.2% under the reference case). Over the same period, the world oil prices are assumed to average about $98 per barrel (in US$2008) instead of $75 per barrel under the reference case.

Under the alternative scenario, with the measures included in this Plan, the modeling also makes use of the "low" expected reductions where available, as indicated in this report.

Environment Canada's E3MC Model

Environment Canada's E3MC has two components: Energy 2020, which incorporates Canada's energy supply and demand structure, and TIM, Informetrica's macroeconomic model of the Canadian economy.

Energy 2020 is an integrated multi-region, multi-sector North American model that simulates the supply, price and demand for all fuels. The model can determine energy output and prices for each sector, both in regulated and unregulated markets. It simulates how factors like energy prices and Government policies affect the choices that consumers and businesses make in the purchase and use of energy. The model's outputs, which include changes in energy use, energy prices, greenhouse gas emissions, investment costs and possible cost savings from policies, are used to identify the direct effects stemming from greenhouse gas reduction measures. The resulting savings and investments from Energy 2020 are then used as inputs into TIM.

TIM is used to examine consumption, investment, production, and trade decisions in the whole economy. It captures not only the interaction among industries, but also the implications for changes in producer prices, relative final prices and income. It also factors in Government fiscal balances, monetary flows, interest and exchange rates.

More specifically, TIM incorporates 133 industries at a provincial and territorial level. It also has an international component to account for exports and imports, covering approximately 100 commodities. The model projects the direct impacts on the economy's final demand, output, employment, price formation and sectoral income that result from various policy choices. These, in turn, permit an estimation of the effect of climate change policy and related impacts on the national economy.

Treatment of Interaction Effects

The analytical approach permitted by E3MC addresses several key modeling challenges, namely additionality, free ridership, rebound effects, and policy-interaction effects.

The additionality issue refers to the question of what would have happened without the initiative in question. Problems of additionality arise when the stated emissions reductions do not reflect the difference in emissions between equivalent scenarios with and without the initiative in question. This will be the case if stated emissions reductions from an initiative have already been included in the reference case – emissions reductions will effectively be double-counted in the absence of appropriate

adjustments. In the E3MC model, additionality is controlled for by the fact that model structure is based on incremental or marginal decision making. The E3MC model assumes a specific energy efficiency or emission intensity profile at the sector and end-use point (e.g., space heating, lighting, auxiliary power, etc). Under the E3MC modeling philosophy, if the initiative in question was to increase the efficiency of a furnace, only the efficiency of a new furnace would be changed. The efficiency of older furnaces would not change unless those furnaces are retired and replaced with higher efficiency ones. As such, any change in the model is incremental to what is reflected in the business-as-usual assumptions.

A related problem, free ridership, arises when stated reductions include the results of behaviour that would happen regardless of the policy. This can occur when subsidies are paid to all purchasers of an item (e.g., a high efficiency furnace), regardless of whether they purchased the item because of the subsidy. Those who would have purchased the product regardless are termed free riders. In our model, the behaviour of free-riders has already been accounted for in the reference case. Their emissions are not counted, therefore, toward the impact of the policy. Instead, it is only the incremental take-up of the emissions-reducing technology that is counted.

The rebound effect describes the increased use of a more efficient product resulting from the implied decrease in the price of its use. For example, a more efficient car is cheaper to drive and so people may drive more. Emissions reductions will generally be overestimated by between 5% and 20%, if estimates do not account for increased consumption due to the rebound effect. Within the model, we have mechanisms for fuel choice, process efficiency, device efficiency, short-term budget constraints and cogeneration, which all react to changes in energy and emissions costs in different time frames.[11] All these structures work to simulate the rebound effect – in the example above, the impact of extra kilometres that may be driven as a result of improved fuel efficiency are automatically netted out of the associated emissions reduction estimates. Finally, emissions-reduction policies such as the ones defined in the Government's plan interact with each other, with a resulting impact on their overall effectiveness. A policy package containing more than one measure or policy would ideally take into account this impact to understand the true contribution the policy package is making (in this case to emission reductions). This impact is described through what are known as policy interaction effects.

E3MC is a comprehensive and integrated model focusing on the interactions between sectors and policies. In the demand sectors, the fuel choice, process efficiency, device efficiency, and level of self-generation are all integrally combined in a consistent manner. The model has detailed equations to ensure that all the interactions between these structures are simulated with no loss of energy or efficiency. For example, the electric generation sector responds to the demand for electricity from the energy demand sectors, so any policy to reduce electricity demand in the consumer sectors will impact the electric generation sector. The model accounts for the emission in the electric generation sector as well as the consumer demand sectors. As the electric sector reduces its emissions intensity, policies designed to reduce electric demand in the consumer sectors will cause less of an emissions reduction. The natural gas and oil supply sectors similarly respond to the demands from the consumer sectors, including the demands for refined petroleum products for transportation. As well, the export by supply sectors of their products is also simulated.

Taken as a whole, the E3MC model provides a detailed representation of technologies that produce goods and services throughout the economy and can realistically simulate capital stock turnover and

[11] A shift in energy prices will cause cogeneration to shift in the short to medium term, device efficiency to adjust over the short to mid-term, process efficiency to adjust in the mid term, and fuel choice to react in the mid- to long-term. The actual adjustment times depend on the particular sector.

choices among technologies. It also includes a representation of equilibrium feedbacks, such that supply and demand for goods and services adjust to reflect policy. Given its comprehensiveness, E3MC covers all the greenhouse gas emissions sources, including those unrelated to energy use.

Simulation of capital stock turnover

As a technology vintage model, E3MC tracks the evolution of capital stocks over time through retirements, retrofits, and new purchases, in which consumers and businesses make sequential acquisitions with limited foresight about the future. This is particularly important for understanding the implications of alternative time paths for emissions reductions. The model calculates energy costs (and emissions) for each energy service in the economy, such as heated commercial floor space or person kilometre traveled. In each time period, capital stocks are retired according to an age-dependent function (although the retrofitting of un-retired stocks is possible, if warranted by changing economic conditions). Demand for new stocks grows or declines depending on the initial exogenous forecast of economic output (i.e., a forecast that is external to the model and not explained by it) and the subsequent interplay of energy supply-demand with the macroeconomic module. A model simulation iterates between energy supply-demand and the macroeconomic module until there is a convergence. The global convergence criterion is set at 0.1% between iterations. This convergence procedure is repeated for each year over the simulation period.[12] E3MC simulates the competition of technologies at each energy service node in the economy based on a comparison of their cost and some technology-specific controls, such as a maximum market share limit in cases where a technology is constrained by physical, technical or regulatory means from capturing all of a market. The technology choice simulation reflects the financial costs as well as the consumer and business preferences, revealed by real-world technology acquisition behaviour.

Model Challenges and Limitations

While E3MC is a very sophisticated analytical tool, no model can fully capture the complicated interactions associated with given policy measures between and within markets or between firms and consumers. Unlike computable general equilibrium models, however, the E3MC model does not fully equilibrate Government budgets and the markets for employment and investment. That is, the modeling results reflect rigidities such as unemployment and Government surpluses/deficits. Furthermore, the model, as used by Environment Canada, does not generate changes in nominal interest rates and exchange rates, as would occur under a monetary policy response to a major economic event.

[12] The energy technology simulation component of the E3MC model (i.e., Energy 2020) does not have an explicit test for convergence because of the algorithm used for in the model. The macroeconomic component of the E3MC model (i.e. The Informetrica Model or TIM) is used to test for convergence between the two models because logically if one model continues to send the identical information to the other model then necessarily the other model should find the exact same solution as before. As the initial testing showed that after about three iterations most of the variables in TIM were very close to convergence, the maximum iteration for convergence is set to five.

Annex 3

Sector and Labour Impact Projections under the Government's Response to the KPIA

Just Transition for Workers

Pursuant to the requirements of paragraph 5 (1) (a) (iii.1) of the Act regarding measures respecting a just transition for workers affected by greenhouse gas emission reductions, the Government considered the requirement and determined that the implementation of regulatory or other measures proposed in this report will not require significant worker adjustment in regulated industries.

Under a modeled scenario where all the federal mitigation measures included in this plan are implemented employment levels are projected to increase from 17.1 million in 2008 to 17.8 million in 2012. This represents approximately 64,000 additional potential jobs per year during the Kyoto Protocol period. Comparing employment levels under the *Kyoto Protocol Implementation Act* to a Reference scenario – a scenario that does not include the measures included in this plan and only includes those federal and provincial measures announced as of January 1, 2006 – the analysis suggests no discernable or statistically significant impact on employment. By 2012, with all of the federal measures included in this plan implemented employment is expected to be 17.8 million compared to 17.7 million in the reference case.[13] Based on these results, the Government concluded that there will not be a significant impact on employment. Therefore, a just transition for workers is not necessary.

Equitable Distribution among Sectors

Paragraph 5 (1) (d) of the Act requires the Government to ensure "an equitable distribution of greenhouse gas emission reduction levels among the sectors of the economy that contribute to greenhouse gas emissions". The integrated modeling suggests that by 2012, greenhouse emissions could be some 74 Mt lower than those projected in the business-as-usual case. The model further suggests that the majority of these reductions would occur in the regulated industrial sectors (i.e., 53 Mt or about 72% of the reductions are expected to occur in 2012). The agricultural, wastes and others and transportation sector is also expected to make an important contribution (i.e., some 17% and 9% respectively). Based on these results, and more specifically the target incidence of the suite of announced mitigation measures, the Government concluded that there will not be any notable inequities among sectors.

[13] These represent changes in a specific year. Macro-economic changes of this order of magnitude are negligible, and indicate no discernable or statistically significant impact on employment.

Table 2: Projected Sectoral Emission Reductions Under the Government's Response to KPIA					
	2008	2009	2010	2011	2012
Residential	0.1	0.2	0.3	0.4	0.5
Commercial	0.2	0.4	0.5	0.6	0.8
Transportation	0.4	0.9	3.3	4.2	6.3
Industrial: Non-Large Final Emitters	0.0	-0.2	0.3	0.5	0.8
Industrial: Large Final Emitters	0.1	0.6	40.9	47.3	53.7
Agriculture, Wastes & Others	0.0	-0.2	6.9	10.0	12.3
Total Reductions	0.7	1.6	52.2	63.1	74.4

It should be noted that the emissions reductions reported in Table 2 represent where the emission reduction occurs; not where the policies were targeted. This is an important distinction for measures which affect electricity demand, and hence, emissions from the Electric Power Sector.

Measures aimed at reducing electricity demand are typically implemented by residential households or by commercial/institutional users. As such, the reduction in electricity use occurs in the residential or commercial sector. However, any reductions in emissions related to lower electricity use appears in the Industrial: Large Final Emitter category.

Given the treatment of electricity-related emissions, the contribution of the residential and commercial sector is somewhat underestimated, while the contribution of the Electric Power Sector (and Industrial: Large Final Emitter category in general) would be overestimated.

In summary, the modeling suggests that impacts across all sectors will not result in any notable inequities among sectors.

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